

### Question 1

Provide a detailed, stepwise mechanism for the reaction of benzene with Br<sub>2</sub> and FeBr<sub>3</sub>. Make sure to include the activating reaction between Br<sub>2</sub> and FeBr<sub>3</sub> in your mechanism.

Answer: <https://biology-forums.com/index.php?topic=1898535>

### Question 2

With each structure below drawn in its most stable chair conformation, identify the sequence that ranks the structures in order of increasing stability.

- 2 < 3 < 1
- 2 < 1 < 3
- 3 < 1 < 2
- 1 < 2 < 3

Answer: <https://biology-forums.com/index.php?topic=1897465>

### Question 3

When a mole of decane undergoes complete combustion, how many moles of water are formed?

- 1
- 10
- 22
- 15.5
- 11

Answer: <https://biology-forums.com/index.php?topic=1897404>

### Question 4

Draw the important resonance forms for the enolate ion/s that are formed when acetophenone reacts with base.

Answer: <https://biology-forums.com/index.php?topic=1899089>

### Question 5

Esters and amides are most easily made by nucleophilic acyl substitution reactions on \_\_\_\_\_.

- acid anhydrides.
- carboxylates.
- acid chlorides.
- carboxylic acids.
- alcohols.

Answer: <https://biology-forums.com/index.php?topic=1898953>

### Question 6

Which compound would you expect to see a broad absorption with two spikes around 3300 cm<sup>-1</sup> and a strong absorption at 1640 cm<sup>-1</sup>?

- CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>
- CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CONHCH<sub>3</sub>
- CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NHCH<sub>3</sub>
- CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CONH<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1899257>

### Question 7

Starting with cyclohexene and employing a Dieckmann cyclization show how the compound below can be prepared.

Answer: <https://biology-forums.com/index.php?topic=1899152>

### Question 8

Circle the alkene below which has the smallest heat of hydrogenation.

Answer: <https://biology-forums.com/index.php?topic=1897943>

### Question 9

Which of the following oxidants will convert a primary alcohol to an aldehyde?

- 1) sodium dichromate /sulfuric acid 3) pyridinium chlorochromate 2) copper oxide 4) dimethylsulfoxide, oxalyl chloride
- 3 & 4
  - 3

- 1, 2, 3, & 4
- 2, 3, & 4
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898448>

### Question 10

Which of the following statements is true?

- All glycosides are reducing sugars.
- Only aldoses, but not ketoses, are reducing sugars.
- All monosaccharides in either the ketose or aldose family are reducing sugars.
- All disaccharides, not monosaccharides, are reducing sugars.
- Only ketoses, but not aldoses, are reducing sugars.

Answer: <https://biology-forums.com/index.php?topic=1899897>

### Question 11

Provide the structure of the major organic compound which results when cyclopentanecarboxylic acid is treated with thionyl chloride and the resulting product is treated with  $\text{LiAlH}[\text{OC}(\text{CH}_3)_3]_3$ .

Answer: <https://biology-forums.com/index.php?topic=1898944>

### Question 12

Provide a Fischer projection of (2R,3R,4S)-2,3,4-trichloroheptane.

Answer: <https://biology-forums.com/index.php?topic=1897695>

### Question 13

Draw the most stable conformation of trans-1-tert-butyl-3-ethylcyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897460>

### Question 14

In order for a vibration mode to be observable in the IR, the vibration must change the \_\_\_\_\_ of the molecule.

Answer: <https://biology-forums.com/index.php?topic=1899225>

### Question 15

Which of the following chloropyridines readily undergo nucleophilic substitution upon treatment with  $\text{NaCN}$ ?

- 4-chloropyridine
- 3-chloropyridine
- 2-chloropyridine
- both A and C
- both A and B

Answer: <https://biology-forums.com/index.php?topic=1898798>

### Question 16

Provide the structure of the major organic product which results when benzaldehyde reacts with hydroxylamine in the presence of acid.

Answer: <https://biology-forums.com/index.php?topic=1898707>

### Question 17

For toluene (shown below), you would expect to see which  $m/z$  fragment in the mass spectrum?

- 43
- 15
- 57
- You would expect to see all three fragments.

Answer: <https://biology-forums.com/index.php?topic=1899304>

### Question 18

Provide the structure of the product which results from the base-catalyzed condensation followed by dehydration between benzophenone and propanal.

Answer: <https://biology-forums.com/index.php?topic=1899138>

### Question 19

When trans-1-iodo-4-methylcyclohexane is heated in methanol, the product mixture is primarily \_\_\_\_\_.

- a mixture of diastomeric alcohols
- a single, chiral compound
- a single, chiral alcohol
- a single, chiral ether
- a mixture of diastomeric ethers

Answer: <https://biology-forums.com/index.php?topic=1897831>

### Question 20

Which of the following is the best initiator for a cationic polymerization?

- BuLi
- PhOH
- (PhCO)<sub>2</sub>
- CH<sub>3</sub>CH(OCH<sub>3</sub>)<sub>2</sub>
- BF<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1900213>

### Question 21

A chemist has isolated a new natural product and determined its molecular formula to be C<sub>24</sub>H<sub>40</sub>O<sub>4</sub>. In hydrogenation experiments the chemist found that each mole of the natural product reacted with two moles of H<sub>2</sub>. How many rings are present in the structure of the new natural product?

- 2
- 3
- 4
- 5
- 6

Answer: <https://biology-forums.com/index.php?topic=1897908>

### Question 22

Give two different one-step methods to convert propanoic acid to methyl propanoate.

Answer: <https://biology-forums.com/index.php?topic=1899052>

### Question 23

Which is more soluble in water, 2-butanone or n-hexane? Explain.

Answer: <https://biology-forums.com/index.php?topic=1898645>

### Question 24

Which of the following compounds is the most reactive dienophile in a Diels-Alder reaction with 1,3-butadiene?

- CH<sub>2</sub>CHOCH<sub>3</sub>
- (CH<sub>3</sub>)<sub>2</sub>CCH<sub>2</sub>
- CH<sub>2</sub>CHCHO
- CH<sub>3</sub>CHCHCH<sub>3</sub>
- CH<sub>2</sub>CH<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1899657>

### Question 25

Why can't N-methyl-2-propanamine be resolved into isolable enantiomers even though the compound is chiral?

Answer: <https://biology-forums.com/index.php?topic=1898764>

### Question 26

How many distinct alkynes exist with a molecular formula of C<sub>4</sub>H<sub>8</sub>?

- 0
- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1898140>

### Question 27

What is the net charge of arginine in a solution of pH 10.0?

Answer: <https://biology-forums.com/index.php?topic=1900001>

### Question 28

Draw the structure of 2,3-dimethyl-2-butanamine

Answer: <https://biology-forums.com/index.php?topic=1898745>

### Question 29

\_\_\_\_\_ is the reaction process through which long-chain alkanes are converted into a mixture of short-chain alkanes and alkenes.

Answer: <https://biology-forums.com/index.php?topic=1897399>

### Question 30

What compound is formed when ethylene oxide is reacted with n-pentyllithium followed by treatment with aqueous acid?

- heptanal
- 2-heptanone
- 1-heptanol
- 2-heptanol
- pentanal

Answer: <https://biology-forums.com/index.php?topic=1899571>

### Question 31

Provide a Newman Projection of the gauche conformer of butane.

Answer: <https://biology-forums.com/index.php?topic=1897423>

### Question 32

Show the reagents necessary to prepare 1,2-epoxy-1-methylcyclopentane from cyclopentanone.

Answer: <https://biology-forums.com/index.php?topic=1899555>

### Question 33

An unknown compound with empirical formula  $C_3H_5$  was treated with  $Br_2/CCl_4$ . The bromine solution went from orangish/red to clear immediately at room temperature. Upon treatment with  $O_3$  followed by work-up with dimethylsulfide the following products were identified. From the information provided what is/are the most likely structure(s) for this unknown compound.

- 
- 
- 
- 
- both A and D

Answer: <https://biology-forums.com/index.php?topic=1898116>

### Question 34

Can one separate a mixture of enantiomers by gas chromatography? Explain.

Answer: <https://biology-forums.com/index.php?topic=1897732>

### Question 35

Do all primary iodides react with  $N_3^-$  at the same rate via the  $SN_2$  mechanism? Explain.

Answer: <https://biology-forums.com/index.php?topic=1897804>

### Question 36

Which of the following conditions will drive the equilibrium of the Fischer esterification towards ester formation?

- addition of water
- removal of water as it is formed
- addition of an inorganic acid as a catalyst
- addition of alcohol
- both B and D

Answer: <https://biology-forums.com/index.php?topic=1898933>

### Question 37

Calculate the charge separation for a C-O bond if the bond distance is 1.43 Å and the bond dipole is 0.86 D.

Answer: <https://biology-forums.com/index.php?topic=1897332>

### Question 38

The hydrolysis of esters in base is called \_\_\_\_\_.

- the Hunsdiecker reaction
- the Fischer esterification
- transesterification
- the Dieckmann condensation
- saponification

Answer: <https://biology-forums.com/index.php?topic=1899020>

### Question 39

Consider the one-step conversion of F to G. Given that the reaction is endothermic by 5 kcal/mol and that the energy difference between G and the transition state for the process is 15 kcal/mol, sketch a reaction-energy diagram for this reaction. Make sure to show how the given energy differences are consistent with your sketch.

Answer: <https://biology-forums.com/index.php?topic=1897545>

### Question 40

Which type of protein, globular or fibrous, tends to function primarily as structural parts of an organism?

Answer: <https://biology-forums.com/index.php?topic=1900078>

### Question 41

Draw an acceptable structure for acetylene.

Answer: <https://biology-forums.com/index.php?topic=1898142>

### Question 42

Would a 50/50 mixture of the two compounds below be optically active? Briefly explain your answer.

Answer: <https://biology-forums.com/index.php?topic=1897734>

### Question 43

Draw the Fischer projection of L-valine at a pH of 12.

Answer: <https://biology-forums.com/index.php?topic=1899996>

### Question 44

Provide a detailed, stepwise mechanism for the Robinson annulation reaction between 2-methylcyclohexanone and methyl vinyl ketone.

Answer: <https://biology-forums.com/index.php?topic=1899184>

### Question 45

What is the major organic product which results when cycloheptene is irradiated in the presence of N-bromosuccinimide?

- 1,2-dibromocycloheptane
- 2-bromocycloheptene
- 1-bromocycloheptene
- 3-bromocycloheptene
- 4-bromocycloheptene

Answer: <https://biology-forums.com/index.php?topic=1899626>

### Question 46

Devise an efficient method for preparing 2-phenylethanamine from 2-phenylethanol.

Answer: <https://biology-forums.com/index.php?topic=1898845>

### Question 47

Straight-chain alkanes are also called \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897342>

### Question 48

Provide two reasons why it would be difficult to prepare ethoxycyclopentane via an intermolecular dehydration route from ethanol and cyclopentanol.

Answer: <https://biology-forums.com/index.php?topic=1899531>

### Question 49

Is cyclooctatetraene a planar molecule? Explain.

Answer: <https://biology-forums.com/index.php?topic=1899730>

### Question 50

What series of synthetic steps could be used to prepare  $(\text{CH}_3)_2\text{CHCHO}$  from  $(\text{CH}_3)_3\text{CH}$ ?

Answer: <https://biology-forums.com/index.php?topic=1898445>

### Question 51

The electron density of \_\_\_\_\_ orbitals has spherical symmetry.

Answer: <https://biology-forums.com/index.php?topic=1897097>

### Question 52

An amino acid analyzer can be used to determine \_\_\_\_\_.

- the sequence of amino acids in a peptide
- the identity of the amino acids present in a peptide
- the relative amounts of the amino acids present in a peptide
- both A and C
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1900053>

### Question 53

Diethyl ether is often used as the solvent for reactions with Grignard reagents, but cyclic ethers like ethylene oxide will react with a Grignard reagent to form an alcohol. Why?

Answer: <https://biology-forums.com/index.php?topic=1899560>

### Question 54

How many distinct alkene products are possible, including stereoisomers, when the alkyl iodide below undergoes E2 elimination?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1897848>

### Question 55

Provide the structure of succinic acid.

Answer: <https://biology-forums.com/index.php?topic=1898868>

### Question 56

While the carbonyl stretching frequency for simple aldehydes, ketones, and carboxylic acids is about  $1710\text{ cm}^{-1}$ , the carbonyl stretching frequency for amides is about \_\_\_\_\_.

- $1735\text{ cm}^{-1}$
- $1700\text{ cm}^{-1}$
- $2200\text{ cm}^{-1}$
- $1660\text{ cm}^{-1}$
- $1800\text{ cm}^{-1}$

Answer: <https://biology-forums.com/index.php?topic=1898997>

### Question 57

Provide the structure of the transition state in the first propagation step of the free radical chlorination of ethane.

Answer: <https://biology-forums.com/index.php?topic=1897546>

### Question 58

Which of the following compounds are covalent compounds?

- KCl
- $\text{CF}_4$

- NH<sub>3</sub>
- both A and B
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1897113>

### Question 59

Which of the following reagents is not typically viewed as an oxidizing agent?

- H<sub>2</sub>O<sub>2</sub>
- O<sub>2</sub>
- KCl
- KMnO<sub>4</sub>
- Cl<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1898418>

### Question 60

Consider the substitution reaction shown below. By what mechanism will the reaction proceed?

- SN<sub>1</sub>
- Free radical reaction
- SN<sub>2</sub>
- There is not enough information to tell.

Answer: <https://biology-forums.com/index.php?topic=1897885>

### Question 61

Which carbon signal shows up in the 0-50 ppm region of the proton spin decoupled <sup>13</sup>C NMR spectrum?

- A
- B
- C
- D
- both C and D

Answer: <https://biology-forums.com/index.php?topic=1899415>

### Question 62

When filling two or more orbitals of the same energy with electrons, the electrons will go into different orbitals rather than pair up in the same orbital.

- true
- false

Answer: <https://biology-forums.com/index.php?topic=1897095>

### Question 63

When pyridine is treated with a mixture of nitric and sulfuric acids, the major product is \_\_\_\_\_.

- 4-nitropyridine
- 4-aminopyridine
- 2-nitropyridine
- 3-nitropyridine
- 3-aminopyridine

Answer: <https://biology-forums.com/index.php?topic=1898801>

### Question 64

Compound A (C<sub>4</sub>H<sub>8</sub>O<sub>4</sub>) gives a positive test with Tollen's reagent. Treatment of A with bromine water produces an optically active compound B. Oxidation of A with nitric acid gives an optically inactive compound C. Compound A can be prepared from L-glyceraldehyde by a Kiliani-Fischer synthesis. What are the structures of A, B, and C?

Answer: <https://biology-forums.com/index.php?topic=1899937>

### Question 65

How many secondary hydrogens are present in the hydrocarbon below?

- 8
- 6
- 2
- 16
- 7

Answer: <https://biology-forums.com/index.php?topic=1897563>

### Question 66

The Williamson ether synthesis occurs by the \_\_\_\_\_ mechanistic pathway.

Answer: <https://biology-forums.com/index.php?topic=1899513>

### Question 67

The monomer shown below, 1,1-bistrifluoromethylethylene, undergoes polymerization via:

- anionic polymerization
- cationic polymerization
- chain-growth polymerization
- radical polymerization

Answer: <https://biology-forums.com/index.php?topic=1900211>

### Question 68

Which of the following bonding patterns of carbon is not allowed in the formation of an organic compound?

Answer: <https://biology-forums.com/index.php?topic=1897177>

### Question 69

Provide the structure of the product that results when diethyl malonate is subjected to the following sequence: 1.  $\text{NaOCH}_2\text{CH}_3$  2.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{I}$  3.  $\text{H}_3\text{O}^+$ , heat.

Answer: <https://biology-forums.com/index.php?topic=1899170>

### Question 70

A linkage of two anomeric carbons is found in \_\_\_\_\_.

- cellobiose
- gentiobiose
- sucrose
- chitin
- amylose

Answer: <https://biology-forums.com/index.php?topic=1899941>

### Question 71

What reactive intermediate is formed when  $\text{CHBr}_3$  is treated with hydroxide or when diazomethane is irradiated?

- carbon radical
- carbanion
- carbene
- carbocation

Answer: <https://biology-forums.com/index.php?topic=1897602>

### Question 72

Draw the HOMO of pentadienyl anion.

Answer: <https://biology-forums.com/index.php?topic=1899637>

### Question 73

Draw the HOMO of pentadienyl cation.

Answer: <https://biology-forums.com/index.php?topic=1899636>

### Question 74

Predict the specific rotation of the compound shown.

- Because both asymmetric centers are R, the compound is dextrorotatory.
- Zero; the compound is achiral.
- It is impossible to predict; it must be determined experimentally.
- Because this compound represents a racemic mixture, the compound is dextrorotatory.
- Because both asymmetric centers are S, the compound is levorotatory.

Answer: <https://biology-forums.com/index.php?topic=1897675>

### Question 75



Which of the labeled atoms in the following structure are sp<sup>2</sup> hybridized?

- 2 & 3
- 2, 3, & 4
- 1 & 4
- 2 & 4
- 2 & 5

Answer: <https://biology-forums.com/index.php?topic=1897260>

### Question 76

In mass spectrometry, what is the most common fragmentation of ethers?

Answer: <https://biology-forums.com/index.php?topic=1899503>

### Question 77

Cyclic hydrocarbons which can be represented as structures containing alternating single and double bonds are called \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1899705>

### Question 78

Draw and name all alkenes which have the molecular formula C<sub>4</sub>H<sub>8</sub>.

Answer: <https://biology-forums.com/index.php?topic=1897919>

### Question 79

Provide the sequence of reagents needed to convert (CH<sub>3</sub>CH<sub>2</sub>O<sub>2</sub>C)<sub>2</sub>CH<sub>2</sub> to cyclopentanecarboxylic acid.

Answer: <https://biology-forums.com/index.php?topic=1899169>

### Question 80

LiAl [OC(CH<sub>3</sub>)<sub>3</sub>]<sub>3</sub>H will reduce an acid chloride to an \_\_\_\_\_.

- alkane
- aldehyde
- acetal
- alcohol
- acid

Answer: <https://biology-forums.com/index.php?topic=1898939>

### Question 81

Suggest a sequence of synthetic steps through which phenylacetic acid can be prepared from toluene and in which Grignard chemistry is employed.

Answer: <https://biology-forums.com/index.php?topic=1898930>

### Question 82

List two of the three limitations usually associated with the Friedel-Crafts alkylation reaction.

Answer: <https://biology-forums.com/index.php?topic=1898580>

### Question 83

Six-membered cyclic hemiacetals and five-membered cyclic hemiacetals are called, respectively, \_\_\_\_\_.

- pyranoses and furanoses
- maltoses and arabinoses
- glycoses and fructoses
- mannososes and xyloses
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899866>

### Question 84

Propose a Wittig reaction-based synthesis of hex-3-ene using propene as the only carbon source and any other reagents necessary.

Answer: <https://biology-forums.com/index.php?topic=1898696>

### Question 85

The \_\_\_\_\_ tells us that each orbital can hold a maximum of 2 electrons.

- LeChatelier principle
- Hund's rule principle

- aufbau principle
- Pauli exclusion principle
- uncertainty principle

Answer: <https://biology-forums.com/index.php?topic=1897093>

### Question 86

Name one factor that is favorable for nucleophilicity but not for basicity.

Answer: <https://biology-forums.com/index.php?topic=1897791>

### Question 87

Compute the empirical and molecular formulas for the compound of molecular weight 86 g/mol which is shown to contain 55.8% C and 7.0% H by elemental analysis.

Answer: <https://biology-forums.com/index.php?topic=1897118>

### Question 88

Draw the important resonance forms of the structure below to indicate the delocalization of charge. Indicate which is the major contributor to the overall structure.

Answer: <https://biology-forums.com/index.php?topic=1897187>

### Question 89

Which of the following alkyl chlorides is least likely to undergo rearrangement during a solvolysis reaction?

- 2-chloro-2-methylpentane
- trans-1-chloro-2-ethylcyclohexane
- cis-1-chloro-2-ethylcyclohexane
- 2-chloro-3-methylpentane
- 2-chloro-4-methylpentane

Answer: <https://biology-forums.com/index.php?topic=1897837>

### Question 90

What is the major structural difference between a ribonucleoside and a ribonucleotide?

Answer: <https://biology-forums.com/index.php?topic=1899944>

### Question 91

How could you make cyclohexanecarboxylic acid from 5-bromopent-1-ene?

Answer: <https://biology-forums.com/index.php?topic=1899171>

### Question 92

In which of the following mechanisms (SN1, SN2, E1, E2) are alkenes the major reaction products?

- SN1 only
- E1 only
- SN2 only
- E2 only
- both E1 and E2

Answer: <https://biology-forums.com/index.php?topic=1897871>

### Question 93

Shown below is one of the sex pheromones from the butterfly family. How many sp hybridized carbon atoms are present in this molecule?

- 0
- 1
- 2
- 3
- 5

Answer: <https://biology-forums.com/index.php?topic=1897250>

### Question 94

Which is a measure of the randomness of a system?

- stoichiometry
- entropy

- enthalpy
- halogenation
- free energy

Answer: <https://biology-forums.com/index.php?topic=1897511>

### Question 95

Show the reagents necessary to prepare trans-2-deuteriocyclohexan-1-ol from cyclohexene.

Answer: <https://biology-forums.com/index.php?topic=1899567>

### Question 96

Given the set of reactants below, complete the acid-base reaction, and indicate whether the equilibrium favors reactants or products using pKa values.  
 $\text{CH}_3\text{CH}_2\text{O}^- + \text{NH}_3$

Answer: <https://biology-forums.com/index.php?topic=1898337>

### Question 97

Another name for a urethane is a(n) \_\_\_\_\_.

- carbamate ester
- orthoester
- carbamic acid
- carbonate ester
- aryl diisocyanate

Answer: <https://biology-forums.com/index.php?topic=1900288>

### Question 98

How is a fat distinguished from an oil, (a) based on a physical property difference and (b) based on a difference in molecular structure?

Answer: <https://biology-forums.com/index.php?topic=1900131>

### Question 99

Use resonance structures to explain why the compound shown below is considered to be antiaromatic.

Answer: <https://biology-forums.com/index.php?topic=1899756>

### Question 100

In the addition of an electrophile to acetophenone, which of the following best describes the expected mode of reaction?

- All positions (o, m, and p) are equally activated to attack by the electrophile.
- The o,p-positions are most activated to attack by the electrophile.
- The m-positions are most activated to attack by the electrophile.
- The m-positions are most deactivated to attack by the electrophile.
- The o,p-positions are most deactivated to attack by the electrophile.

Answer: <https://biology-forums.com/index.php?topic=1898555>

### Question 101

If an acyclic alkane hydrocarbon contains n carbon atoms, how many hydrogen atoms must it also contain?

- $2n + 2$
- n
- $n - 2$
- $2n$
- $n + 2$

Answer: <https://biology-forums.com/index.php?topic=1897344>

### Question 102

Absorption of what type of electromagnetic radiation results in transitions among allowed nuclear magnetic spin states?

- X-rays
- radio waves
- microwaves
- ultraviolet light
- infrared light

Answer: <https://biology-forums.com/index.php?topic=1899202>

### Question 103

Describe a sequence of reactions by which 1-propylcyclohexan-1-ol can be straightforwardly prepared from propyne.

Answer: <https://biology-forums.com/index.php?topic=1898236>

### Question 104

Glucose has a specific rotation of  $+52.8^\circ$ . Predict the concentration of a glucose aqueous solution contained in a 10 cm long polarimetry tube if a rotation of  $+15.8^\circ$  was observed.

- .0299 g/mL
- 3.34 g/mL
- .334 g/mL
- 0.299 g/mL

Answer: <https://biology-forums.com/index.php?topic=1897678>

### Question 105

Which of the following compounds is most soluble in water?

- 3-octanone
- acetone
- benzophenone
- 2-butanone
- cyclohexanone

Answer: <https://biology-forums.com/index.php?topic=1898644>

### Question 106

Which is more soluble in water, butan-1-ol or decan-1-ol? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1898328>

### Question 107

What product is formed in the crossed Claisen condensation between methyl benzoate and cyclohexanone?

Answer: <https://biology-forums.com/index.php?topic=1899159>

### Question 108

Provide a Lewis structure for a molecule with molecular formula  $\text{CH}_2\text{O}_2$ .

Answer: <https://biology-forums.com/index.php?topic=1897162>

### Question 109

Rank the following phenols in order of acidity (most acidic = first, least acidic = last).

- $\text{C} > \text{B} > \text{A}$
- $\text{B} > \text{C} > \text{A}$
- $\text{A} > \text{B} > \text{C}$
- $\text{C} > \text{A} > \text{B}$

Answer: <https://biology-forums.com/index.php?topic=1898338>

### Question 110

Which of the following statements regarding cyclobutane is correct?

- The lowest energy conformation of cyclobutane is known as the chair conformation.
- The lowest energy conformation is one in which the bond angles are slightly less than  $90^\circ$  even though this increases angle strain.
- The lowest energy conformation is one in which the bond angles are greater than  $90^\circ$  so that angle strain is significantly reduced.
- The lowest energy conformation of cyclobutane is a planar one in which all of the bond angles is  $90^\circ$ .
- None of the above statements is correct.

Answer: <https://biology-forums.com/index.php?topic=1897438>

### Question 111

Which sequence correctly ranks the following aromatic rings in order of increasing rate of reactivity with chlorine and aluminum chloride?

- $1 < 2 < 3$
- $1 < 3 < 2$
- $3 < 2 < 1$
- $2 < 3 < 1$
- $2 < 1 < 3$

Answer: <https://biology-forums.com/index.php?topic=1898545>

### Question 112

Which of the following reactive intermediates can best be described as both nucleophilic and strongly basic?

- carbanions
- free radicals
- carbenes
- carbocations
- alkanes

Answer: <https://biology-forums.com/index.php?topic=1897590>

### Question 113

How can one prepare ethyl cyclohexyl ketone from cyclohexanecarboxylic acid?

Answer: <https://biology-forums.com/index.php?topic=1898949>

### Question 114

Describe a sequence of reactions by which hexan-2-ol can be straightforwardly prepared from hex-1-yne.

Answer: <https://biology-forums.com/index.php?topic=1898269>

### Question 115

Draw a Newman projection of the most stable conformation of 2-methylpropane.

Answer: <https://biology-forums.com/index.php?topic=1897409>

### Question 116

When  $\text{H}_2\text{NCH}_2\text{CH}_2\text{CH}_2\text{COCH}_3$  is heated in the presence of an acid catalyst, a reaction occurs. The product has the formula  $\text{C}_6\text{H}_{11}\text{N}$ . Provide the structure of this product.

Answer: <https://biology-forums.com/index.php?topic=1898704>

### Question 117

Using any compound that contains a carbonyl as your starting material, how would you synthesize 2-methylhexan-2-ol?

Answer: <https://biology-forums.com/index.php?topic=1898414>

### Question 118

What is the best way to make the ether shown below using a Williamson Ether Synthesis reaction?

- $(\text{CH}_3)_3\text{CO}^- + \text{BrCH}_3$
- $(\text{CH}_3)_3\text{CBr} + \text{HOCH}_3$
- $(\text{CH}_3)_3\text{COH} + \text{BrCH}_3$
- $(\text{CH}_3)_3\text{CBr} + ^-\text{OCH}_3$

Answer: <https://biology-forums.com/index.php?topic=1898511>

### Question 119

Draw the Lewis structure for boric acid,  $\text{B}(\text{OH})_3$ , including all non-bonding lone pairs.

Answer: <https://biology-forums.com/index.php?topic=1897165>

### Question 120

Reduction of a ketone with  $\text{NaBH}_4$  will result in the formation of \_\_\_\_\_.

- a primary alcohol
- a secondary alcohol
- an alkene
- an alkane
- an aldehyde

Answer: <https://biology-forums.com/index.php?topic=1898396>

### Question 121

A carbon-hydrogen bond in ethane ( $\text{CH}_3\text{CH}_3$ ) is best described as \_\_\_\_\_.

- a multiple bond
- highly polar
- ionic

- resonance stabilized
- essentially nonpolar

Answer: <https://biology-forums.com/index.php?topic=1897104>

### Question 122

What type of carbon environment does not generate a signal in the DEPT-90 spectrum and gives a positive peak in the DEPT-135 spectrum?

- quaternary
- methine
- methylene
- methyl
- carbonyl

Answer: <https://biology-forums.com/index.php?topic=1899363>

### Question 123

Which of the following terms best describes the reactive nature of a Grignard reagent?

- carbocation
- nucleophile
- free radical
- electrophile
- carbene

Answer: <https://biology-forums.com/index.php?topic=1898353>

### Question 124

How many distinct dichlorination products can result when isobutane is subjected to free radical chlorination?

- 1
- 2
- 3
- 4
- 6

Answer: <https://biology-forums.com/index.php?topic=1897557>

### Question 125

Provide the structure of 2-bromo-2-methylbutanoyl chloride.

Answer: <https://biology-forums.com/index.php?topic=1898983>

### Question 126

Draw the structure of the isomeric form of 1,2-dichloroethene (CHClCHCl) which has no net dipole moment.

Answer: <https://biology-forums.com/index.php?topic=1897293>

### Question 127

\_\_\_\_\_ is dissolved in water to make the solution sold commercially as rubbing alcohol.

Answer: <https://biology-forums.com/index.php?topic=1898295>

### Question 128

Which of the following stretches tends to be the least intense?

- C=O
- C=C
- C-H
- O-H (carboxylic acid)
- O-H (alcohol)

Answer: <https://biology-forums.com/index.php?topic=1899219>

### Question 129

Which of the following compounds undergoes reaction with HNO<sub>3</sub>/H<sub>2</sub>SO<sub>4</sub> at the fastest rate?

- acetophenone
- chlorobenzene
- ethylbenzene
- nitrobenzene
- benzenesulfonic acid

Answer: <https://biology-forums.com/index.php?topic=1898566>

### Question 130

When compound I, C<sub>7</sub>H<sub>16</sub>, was treated with chlorine and light it yielded 3 monochlorination products that could be separated by chromatography. Two of the products were primary alkyl halides and the other was a secondary alkyl halide. Provide a possible structure for compound I.

Answer: <https://biology-forums.com/index.php?topic=1897576>

### Question 131

When (S)-3-bromopent-1-ene is heated in water, which of the following compounds is not produced?

- (S)-pent-1-en-3-ol
- pent-4-en-1-ol
- (E)-pent-2-en-1-ol
- (Z)-pent-2-en-1-ol
- (R)-pent-1-en-3-ol

Answer: <https://biology-forums.com/index.php?topic=1899608>

### Question 132

What reagents can be used to convert 1-hexyne into 2-hexanone?

- 1. CH<sub>3</sub>MgBr; 2. CO<sub>2</sub>
- Hg<sup>2+</sup>, H<sub>2</sub>SO<sub>4</sub>, H<sub>2</sub>O
- 1. O<sub>3</sub>; 2. (CH<sub>3</sub>)<sub>2</sub>S
- 1. Sia<sub>2</sub>BH; 2. H<sub>2</sub>O<sub>2</sub>, NaOH
- 1. H<sub>2</sub>, Ni; 2. Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>, H<sub>2</sub>SO<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1898659>

### Question 133

Devise an efficient method for preparing m-cresol from m-toluidine.

Answer: <https://biology-forums.com/index.php?topic=1898835>

### Question 134

Provide the structure of isotactic polystyrene.

Answer: <https://biology-forums.com/index.php?topic=1900259>

### Question 135

When 2,4-dinitrochlorobenzene is treated with sodium hydroxide at 100°C followed by protonation \_\_\_\_\_.

- 3,5-dinitrophenol is formed via an electrophilic aromatic substitution mechanism
- 2,4-dinitrophenol is formed via an addition-elimination nucleophilic aromatic substitution mechanism
- 2,4-dinitrophenol is formed via an elimination-addition nucleophilic aromatic substitution mechanism
- 2,4-dinitrophenol is formed via an electrophilic aromatic substitution mechanism
- 3,5-dinitrophenol is formed via an elimination-addition nucleophilic aromatic substitution mechanism

Answer: <https://biology-forums.com/index.php?topic=1898598>

### Question 136

What is the approximate pK<sub>a</sub> of diethyl malonate?

- 45
- 20
- 13
- 10
- 4

Answer: <https://biology-forums.com/index.php?topic=1899164>

### Question 137

In the mass spectrum of isobutylbenzene, the base peak occurs at m/z \_\_\_\_\_.

- 105
- 91
- 134
- 119
- 133

Answer: <https://biology-forums.com/index.php?topic=1899826>

### Question 138

Which of the following is least likely to undergo a smooth crossed Claisen condensation with methyl pentanoate?

- PhCH<sub>2</sub>CO<sub>2</sub>CH<sub>3</sub>
- PhCO<sub>2</sub>CH<sub>3</sub>
- HCO<sub>2</sub>CH<sub>3</sub>
- (CH<sub>3</sub>O)<sub>2</sub>CO
- (CH<sub>3</sub>)<sub>3</sub>CCO<sub>2</sub>CH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1899156>

### Question 139

Draw a three-dimensional model of methanol, CH<sub>3</sub>OH, including lone pairs of electrons using wedges, dashes and straight lines.

Answer: <https://biology-forums.com/index.php?topic=1897246>

### Question 140

Draw a Fischer projection of the product which results when (R)-2-bromobutane is treated with the following sequence of reagents: and

Answer: <https://biology-forums.com/index.php?topic=1898931>

### Question 141

\_\_\_\_\_ polymers result from rapid reaction of one molecule at a time with a growing polymer chain, usually with a reactive intermediate at the growing end of the chain.

- Condensation
- Amorphous
- Step-growth
- Addition

Answer: <https://biology-forums.com/index.php?topic=1900209>

### Question 142

Consider the conversion of X to Z through the sole intermediate Y. Given the reaction-energy diagram shown below, which step is the rate-limiting step? Explain your reasoning.

Answer: <https://biology-forums.com/index.php?topic=1897547>

### Question 143

The energy barrier for carbon-carbon bond rotation in propane is mainly due to \_\_\_\_\_.

- steric strain
- muscle strain
- bond strain
- angle strain
- torsion strain

Answer: <https://biology-forums.com/index.php?topic=1897406>

### Question 144

Is the mirror image of the following molecule an enantiomer or is it superimposable with it?

Answer: <https://biology-forums.com/index.php?topic=1897626>

### Question 145

The aldol condensation is \_\_\_\_\_.

- a type of esterification
- an isomerization
- a tautomerization
- an irreversible reaction
- an equilibrium reaction

Answer: <https://biology-forums.com/index.php?topic=1899127>

### Question 146

What series of synthetic steps could be used to prepare hexan-3-ol from propan-1-ol?

Answer: <https://biology-forums.com/index.php?topic=1898439>



### Question 147

Provide the structure of the major organic product which results when D-ribose is subjected to a Ruff degradation.

Answer: <https://biology-forums.com/index.php?topic=1899928>

### Question 148

Which of the following is a nucleophile that does conjugate additions?

- $\text{CH}_3\text{CH}_2\text{MgBr}$
- $\text{CH}_2\text{CHCO}_2\text{CH}_3$
- $(\text{CH}_3)_2\text{CuLi}$
- $\text{CH}_2\text{CHCN}$
- $\text{CH}_2\text{CHCHO}$

Answer: <https://biology-forums.com/index.php?topic=1899179>

### Question 149

Which of the class of organic compound below contains a carbonyl group as a part of its structure?

- ester
- ketone
- aldehyde
- carboxylic acid
- all of the above

Answer: <https://biology-forums.com/index.php?topic=1897315>

### Question 150

Propose a reasonable synthetic route to prepare cyclohexylacetic acid from methylenecyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1898925>

### Question 151

Ethylene oxide can be polymerized to form Carbowax. What conditions are best for the polymerization of ethylene oxide?

- carbene
- anionic
- cationic
- free-radical
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900221>

### Question 152

Draw the HOMO of allyl anion.

Answer: <https://biology-forums.com/index.php?topic=1899635>

### Question 153

What term describes the structural relationship between (E)- and (Z)-2-pentene?

- constitutional isomers
- not isomers
- enantiomers
- diastereomers
- conformers

Answer: <https://biology-forums.com/index.php?topic=1897701>

### Question 154

What compound is produced when  $(\text{CH}_3)_2\text{CHCH}_2\text{Br}$  is subjected to the following sequence of steps?

1. Mg, Et<sub>2</sub>O
  2. CO<sub>2</sub>
- 3-methylbutanoic acid
  - 2-methylpropanoic acid
  - 3-methylpropanoic acid
  - 2-methylhexanoic acid
  - 2-methylbutanoic acid

Answer: <https://biology-forums.com/index.php?topic=1898908>

### Question 155

What descriptive term is applied to the type of diene represented by 2,4-hexadiene?

- cumulated diene
- alkynyl diene
- isolated diene
- conjugated diene
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899575>

### Question 156

Draw the most stable conformation of trans-1,4-dipropylcyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897457>

### Question 157

Why is the following structure not a meso compound?

Answer: <https://biology-forums.com/index.php?topic=1897691>

### Question 158

Addition of alanine to distilled water will produce \_\_\_\_\_.

- denaturation
- a neutral solution
- a slightly acidic solution
- a slightly basic solution
- hydrolysis

Answer: <https://biology-forums.com/index.php?topic=1899985>

### Question 159

Anomers of D-glucopyranose differ in their stereochemistry at \_\_\_\_\_.

- C2
- C5
- C3
- C1
- C4

Answer: <https://biology-forums.com/index.php?topic=1899877>

### Question 160

Which of the following compounds would undergo autoxidation most readily?

- MTBE
- diethyl ether
- dibenzyl ether
- isobutyl phenyl ether

Answer: <https://biology-forums.com/index.php?topic=1899543>

### Question 161

Name the major organic product which results when 3-ethylbenzenesulfonic acid is heated in aqueous acid.

Answer: <https://biology-forums.com/index.php?topic=1898537>

### Question 162

Which of the following is the best Michael acceptor?

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1899180>

### Question 163

Which amino acid has an indole ring in its side chain?

- tyrosine
- tryptophan
- isoleucine
- asparagine
- histidine

Answer: <https://biology-forums.com/index.php?topic=1899969>

### Question 164

Name the compound  $\text{PhCO}_3\text{H}$  and give its most common use as a reagent.

Answer: <https://biology-forums.com/index.php?topic=1898107>

### Question 165

Which region of the electromagnetic spectrum, radio or visible, is characterized by waves of shorter wavelength?

Answer: <https://biology-forums.com/index.php?topic=1899207>

### Question 166

3-Pentanol can be oxidized to 3-pentanone using sodium dichromate. How can the completeness of conversion be gauged using IR spectroscopy?

Answer: <https://biology-forums.com/index.php?topic=1899284>

### Question 167

Provide the structure of the monomer from which poly(acrylonitrile) is formed.

Answer: <https://biology-forums.com/index.php?topic=1900232>

### Question 168

Would you expect the carbonyl carbon of benzaldehyde to be more or less electrophilic than that of acetaldehyde? Explain using resonance structures.

Answer: <https://biology-forums.com/index.php?topic=1898624>

### Question 169

Which of the following factors is favorable for nucleophilicity but not basicity?

- sterically hindered
- negatively charged
- highly polarizable
- low electronegativity

Answer: <https://biology-forums.com/index.php?topic=1897796>

### Question 170

Which of the following best describes DDT?

- a Freon used as a foaming agent
- a polybrominated organic compound used as a herbicide
- a polychlorinated organic compound used as an insecticide
- a chlorocarbon used to decaffeinate coffee beans
- a mixed alkyl halide used as an anesthetic

Answer: <https://biology-forums.com/index.php?topic=1897772>

### Question 171

What descriptive term is applied to the type of diene represented by 1,5-octadiene?

- conjugated diene
- cumulated diene
- alkynyl diene
- isolated diene
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899576>

### Question 172

When cycloheptatriene is deprotonated, an anion with seven resonance forms of equal energy can be drawn. Given this fact, explain why cycloheptatriene is only slightly more acidic than propene.

Answer: <https://biology-forums.com/index.php?topic=1899745>

### Question 173

Which diastereomer of 1-bromo-4-*t*-butylcyclohexane, the *cis* or the *trans*, undergoes elimination more rapidly when treated with sodium ethoxide? Explain your answer.

Answer: <https://biology-forums.com/index.php?topic=1897867>

### Question 174

After completing the synthesis of 3-methylpentanoic acid, which of the following treatments will neutralize the mineral acids and facilitate the distribution of the organic acid from the organic layer to the aqueous extraction layer?

- extraction with ether
- extraction with water
- extraction with aqueous NaCl
- extraction with dilute aqueous HCl
- extraction with aqueous NaHCO<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1898888>

### Question 175

Which of the following statements applies to the E<sub>2</sub> mechanism?

- It occurs with racemization of stereochemistry.
- Use of a bulky base gives the more highly substituted alkene product.
- It proceeds through the more stable carbocation intermediate.
- The C-H and C-X bonds that break must be *anti*.
- It occurs with inversion of stereochemistry.

Answer: <https://biology-forums.com/index.php?topic=1897976>

### Question 176

The carbon-carbon bond length in ethylene is \_\_\_\_\_ than the carbon-carbon bond length in ethane, and the HCH bond angle in ethylene is \_\_\_\_\_ the HCH bond angle in ethane.

- longer; larger than
- longer; the same as
- shorter; smaller than
- longer; smaller than
- shorter; larger than

Answer: <https://biology-forums.com/index.php?topic=1897887>

### Question 177

Draw the line-angle formula for three compounds with molecular formula C<sub>3</sub>H<sub>8</sub>O.

Answer: <https://biology-forums.com/index.php?topic=1897208>

### Question 178

Which of the following condensed formulas correctly represents the line-angle structure shown below?

- C<sub>2</sub>(CH<sub>3</sub>)<sub>3</sub>CO<sub>2</sub>H
- CH(CH<sub>3</sub>)<sub>2</sub>CH(CH<sub>3</sub>)CO<sub>2</sub>H
- C(CH<sub>3</sub>)<sub>2</sub>C(CH<sub>3</sub>)CH<sub>2</sub>CO<sub>2</sub>H
- (CH<sub>3</sub>)<sub>2</sub>CC(CH<sub>3</sub>)CO<sub>2</sub>H

Answer: <https://biology-forums.com/index.php?topic=1897207>

### Question 179

Provide a detailed, stepwise mechanism for the acid-catalyzed transesterification of ethyl acetate with *n*-propanol.

Answer: <https://biology-forums.com/index.php?topic=1899018>

### Question 180

What is the hybridization of the oxygen atom in dialkyl ethers?

- s
- p
- sp<sup>2</sup>
- sp<sup>3</sup>
- sp

Answer: <https://biology-forums.com/index.php?topic=1899479>

### Question 181

Which of the following reaction series will result in the formation of a new secondary (2°) alcohol from the beginning alcohol listed at the top?

- Ethanol
- 1. Na°
- 2. CH<sub>3</sub>CH<sub>2</sub>I
- 2-propanol
- 1. K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/acetic acid
- 2. CH<sub>3</sub>-MgBr
- 3. H<sub>3</sub>O<sup>+</sup>
- n-butanol
- 1. H<sub>2</sub>SO<sub>4</sub>/heat
- 2. Hg(OAc)<sub>2</sub> (aq)
- 3. NaBH<sub>4</sub>
- t-butyl alcohol
- 1. K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/acetic acid
- 2. CH<sub>3</sub>-MgBr
- 3. H<sub>3</sub>O<sup>+</sup>
- 2-methylcyclohexanol
- 1. H<sub>2</sub>SO<sub>4</sub>/heat
- 2. OsO<sub>4</sub>/H<sub>2</sub>O<sub>2</sub>
- 3. H<sub>2</sub>SO<sub>4</sub>/heat

Answer: <https://biology-forums.com/index.php?topic=1898493>

### Question 182

A polypeptide was treated with a certain enzyme to yield the following amino acid sequences. What enzyme was used to induce the observed fragmentations?

Val-Pro-Phe Leu-Ser-Lys-Glu-TrpArg-Ile-Ser-Ser-Leu-Tyr

Answer: <https://biology-forums.com/index.php?topic=1900035>

### Question 183

Which of the following commercial polymers are polyesters?

1) Lexan2) Dacron3) Saran4) Orlon5) PET

- 1, 2, & 5
- 2 & 4
- 2 & 5
- 1 & 2
- 3 & 4

Answer: <https://biology-forums.com/index.php?topic=1900321>

### Question 184

Propose a synthesis of 4-phenylbutan-2-ol from 3-phenylpropanal.

Answer: <https://biology-forums.com/index.php?topic=1898684>

### Question 185

N-Methylacetamide is an example of \_\_\_\_\_.

- a secondary amide
- a primary amide
- an imine
- a tertiary amide
- an N, N-disubstituted amide

Answer: <https://biology-forums.com/index.php?topic=1898961>

### Question 186

The boiling point of S-2-butanol is 99°C. What is the boiling point of R-2-butanol?

- 150 C
- 0 C
- 99 C
- -99 C
- You can't tell from the information given.

Answer: <https://biology-forums.com/index.php?topic=1897727>

### Question 187

Given a sample of (R)-2,3-dimethylhexan-3-ol, which of the following would be the best synthesis of (R)-3-chloro-2,3-dimethylhexane?

- PCl<sub>3</sub>
- SOCl<sub>2</sub>
- 1. TsCl/Pyridine  
2. NaCl
- HCl/ZnCl<sub>2</sub>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898484>

### Question 188

Which has the greatest molar heat of combustion?

- cis-1,2-dimethylcyclopentane
- methylcyclohexane
- trans-1,3-dimethylcyclopentane
- cycloheptane
- trans-1,2-dimethylcyclopentane

Answer: <https://biology-forums.com/index.php?topic=1897439>

### Question 189

Styrene undergoes polymerization via what type of mechanism?

- radical polymerization
- cationic polymerization
- anionic polymerization
- It will polymerize via all three mechanisms.

Answer: <https://biology-forums.com/index.php?topic=1900234>

### Question 190

Provide a detailed, stepwise mechanism for the reaction of acetyl chloride with n-propylamine.

Answer: <https://biology-forums.com/index.php?topic=1898814>

### Question 191

If a hydrocarbon has no double or triple bonds, it is said to be \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897341>

### Question 192

Compound A, C<sub>9</sub>H<sub>17</sub>N, is an optically inactive alkaloid, containing a tertiary amine that is not located at the bridgehead of the structures fused bicyclic ring system. Exhaustive alkylation of A with methyl iodide, followed by a Hofmann elimination reaction resulted in a racemic mixture of chiral tertiary amine products B, C<sub>10</sub>H<sub>19</sub>N. Provide a structure for A and one of the enantiomeric products B.

Answer: <https://biology-forums.com/index.php?topic=1898821>

### Question 193

When hexan-1-ol is treated with conc. H<sub>2</sub>SO<sub>4</sub> at moderate temperatures, \_\_\_\_\_ is formed via a(n) \_\_\_\_\_ mechanism.

- di-n-hexyl ether; S<sub>N</sub>2
- di-n-hexyl ether; S<sub>N</sub>1
- di-n-propyl ether; E1
- hex-1-ene; S<sub>N</sub>1
- di-n-hexyl ether; E2

Answer: <https://biology-forums.com/index.php?topic=1899533>

### Question 194

Provide the structure of the major organic compound that results when palmitic acid, CH<sub>3</sub>(CH<sub>2</sub>)<sub>14</sub>CO<sub>2</sub>H, is heated in methanol containing catalytic acid.

Answer: <https://biology-forums.com/index.php?topic=1900143>

### Question 195

Are the two compounds shown below best described as cis-trans isomers, constitutional isomers, or not isomeric?

Answer: <https://biology-forums.com/index.php?topic=1897283>

### Question 196

Which of the following descriptions apply to both D-glucopyranose and L-galactopyranose?

I.They are both ketosesII.They are both aldosesIII.They are enantiomers of each otherIV.They are diastereomers of each otherV.They are epimers of each other

- II and IV
- II, IV and V
- I, IV and V
- I, III and V
- II and III

Answer: <https://biology-forums.com/index.php?topic=1899859>

### Question 197

Which of the following molecules, if isolated in its pure form, would demonstrate optical activity?

- both IV and V
- both I and V
- only II
- both I and III
- both III and IV

Answer: <https://biology-forums.com/index.php?topic=1897716>

### Question 198

Deduce a reasonable structure for the compound which exhibits the following spectroscopic data.

C<sub>5</sub>H<sub>9</sub>ClO<sub>2</sub>: IR: 2700-3400 cm<sup>-1</sup> (broad), 1710 cm<sup>-1</sup>; <sup>1</sup>H NMR (ppm): 1.40 (6H, singlet), 3.60 (2H, singlet), 10.1 (1H, singlet) ppm.

Answer: <https://biology-forums.com/index.php?topic=1898900>

### Question 199

What compound is formed when methyloxirane is reacted with ethylmagnesium bromide followed by treatment with aqueous acid?

- 2-methyl-2-butanol
- 1-pentanol
- 2-pentanol
- 3-methyl-1-butanol
- 2-methyl-1-butanol

Answer: <https://biology-forums.com/index.php?topic=1899572>

### Question 200

Which of the following is the best reaction sequence to use if one wants to accomplish a Markovnikov addition of water to an alkene with minimal skeletal rearrangement?

- hydroboration-oxidation
- water + concentrated acid
- water + dilute acid
- oxymercuration-demercuration
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898056>

### Question 201

In the structure below, the hybridization of the oxygen is \_\_\_\_\_ and the C-O-C bond angle is \_\_\_\_\_.

- sp<sup>2</sup>;

### Question 202

What is the hybridization of the central carbon of allene (1,2-propadiene)?

- p
- sp
- sp<sup>3</sup>
- sp<sup>2</sup>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899574>

### Question 203

Provide the structure of the intramolecular aldol condensation/dehydration product that results when 2,6-heptanedione is heated in base.

Answer: <https://biology-forums.com/index.php?topic=1899143>

### Question 204

What two combinations of Grignard and carbonyl compound can be used to prepare 3-hexanol?

Answer: <https://biology-forums.com/index.php?topic=1898372>

### Question 205

Phantasmidine, shown below, is found in poisonous frog skin and has analgesic properties (J. Nat. Prod. 2010, 331). Assign each chiral center as having either R or S configuration.

Answer: <https://biology-forums.com/index.php?topic=1897670>

### Question 206

An ether solution of PhCO<sub>2</sub>H (A), PhNH<sub>2</sub> (B), and PhCH<sub>3</sub> (C) is extracted with aqueous NaOH. The ether layer will contain what compound(s) after the extraction?

- A + C
- A + B
- A only
- A + B + C
- B + C

Answer: <https://biology-forums.com/index.php?topic=1898887>

### Question 207

Draw the HOMO of 1,3-butadiene.

Answer: <https://biology-forums.com/index.php?topic=1899605>

### Question 208

What alkene, which contains no oxygen atoms and a single CC, will give CH<sub>3</sub>CO(CH<sub>2</sub>)<sub>4</sub>CHO upon treatment with OsO<sub>4</sub> followed by cleavage with periodic acid?

Answer: <https://biology-forums.com/index.php?topic=1898124>

### Question 209

Propose a reasonable synthetic route to prepare butanal from butanoic acid.

Answer: <https://biology-forums.com/index.php?topic=1898941>

### Question 210

Draw an acceptable structure for 4-phenylbut-1-ene.

Answer: <https://biology-forums.com/index.php?topic=1897917>

### Question 211

What compound is also known as Sanger reagent, and how is it used in peptide structure determination?

Answer: <https://biology-forums.com/index.php?topic=1900055>

### Question 212

A protein bonded to a fat would be classified as a \_\_\_\_\_.

- glycoprotein
- lipoprotein
- nucleoprotein
- simple protein
- metalloprotein

Answer: <https://biology-forums.com/index.php?topic=1900076>

### Question 213

1-Methylcyclopentanol is classified as \_\_\_\_\_.

- an enol



- a secondary alcohol
- a primary alcohol
- a phenol
- a tertiary alcohol

Answer: <https://biology-forums.com/index.php?topic=1898300>

### Question 214

Was the compound shown below more likely isolated from an animal or a plant? Explain.

Answer: <https://biology-forums.com/index.php?topic=1900130>

### Question 215

An NMR spectrometer that operates at a frequency of 60 MHz for  $^{13}\text{C}$  NMR spectra, operates at what frequency for  $^1\text{H}$  NMR spectra?

- 120 MHz
- 15 MHz
- 60 MHz
- 240 MHz
- 30 MHz

Answer: <https://biology-forums.com/index.php?topic=1899360>

### Question 216

What effect does conjugation typically have on the frequency at which absorption by CC occurs?

- Conjugation decreases the frequency at which absorption occurs.
- Conjugation increases the frequency at which absorption occurs.
- Conjugation does not affect the frequency at which absorption occurs.

Answer: <https://biology-forums.com/index.php?topic=1899233>

### Question 217

What is the bond order of the carbon-carbon bonds in benzene?

- 1.5
- 0.5
- 3
- 1
- 2

Answer: <https://biology-forums.com/index.php?topic=1899706>

### Question 218

Reaction of ethylmagnesium bromide with which of the following compounds yields a primary alcohol after quenching with aqueous acid?

- n-butyllithium
- $(\text{CH}_3)_2\text{CO}$
- ethylene oxide
- $\text{CH}_3\text{CHO}$
- ethyl acetate

Answer: <https://biology-forums.com/index.php?topic=1898367>

### Question 219

When a monosaccharide reacts to give the pyranose form from its open-chain form, how many distinct pyranose forms are possible?

- 4
- 1
- $4n + 2$ , where n is the number of carbons present
- 2
- $2n$ , where n is the number of carbons present

Answer: <https://biology-forums.com/index.php?topic=1899869>

### Question 220

When 2,2-dibromobutane is heated at  $150^\circ\text{C}$  in the presence of molten KOH, what is the major organic product?

- but-1-ene
- but-2-yne
- 1-bromobut-1-yne
- 1-bromobut-2-yne

- but-1-yne

Answer: <https://biology-forums.com/index.php?topic=1898244>

### Question 221

Show how the following reaction might be constructed using an SN2 reaction by drawing structures for the starting materials.

Answer: <https://biology-forums.com/index.php?topic=1897787>

### Question 222

Consider the equilibrium shown below. When one looks at the equilibrium where  $X = \text{CH}_3$  and the one where  $X = \text{CH}(\text{CH}_3)_2$ , how do the values of the equilibrium constants (Ks) compare?

- The Ks are equal.
- The K where  $X = \text{CH}(\text{CH}_3)_2$  is greater.
- The K where  $X = \text{CH}_3$  is greater.
- The Ks differ only slightly and are both less than 1.

Answer: <https://biology-forums.com/index.php?topic=1897445>

### Question 223

The hydroxide ion ( $\text{HO}^-$ ) cannot function well as which of the following?

- a proton acceptor
- a Lewis base
- a Bronsted-Lowry base
- a nucleophile
- an electron-pair acceptor

Answer: <https://biology-forums.com/index.php?topic=1897147>

### Question 224

If a certain hydrocarbon molecule has 10 carbon atoms, one ring and two triple bonds, how many hydrogens does it have?

- 10
- 12
- 14
- 16
- 18

Answer: <https://biology-forums.com/index.php?topic=1897906>

### Question 225

What class of lipids functions to control blood pressure, inflammatory responses, and the clotting of blood?

- prostaglandins
- triglyceride
- phospholipids
- steroid

Answer: <https://biology-forums.com/index.php?topic=1900181>

### Question 226

Describe a sequence of reactions by which hept-3-yne can be straightforwardly prepared from acetylene.

Answer: <https://biology-forums.com/index.php?topic=1898228>

### Question 227

Consider the three isomeric alkanes n-hexane, 2,3-dimethylbutane, and 2-methylpentane. Which of the following correctly lists these compounds in order of increasing boiling point?

- 2-methylpentane < 2,3-dimethylbutane < n-hexane
- n-hexane < 2,3-dimethylbutane < 2-methylpentane
- 2,3-dimethylbutane < 2-methylpentane < n-hexane
- n-hexane < 2-methylpentane < 2,3-dimethylbutane
- 2-methylpentane < n-hexane < 2,3-dimethylbutane

Answer: <https://biology-forums.com/index.php?topic=1897388>

### Question 228

Among the following alkyl halides, choose the one with the lowest boiling point.

- t-butyl bromide

- t-butyl iodide
- n-butyl chloride
- t-butyl chloride
- n-butyl iodide

Answer: <https://biology-forums.com/index.php?topic=1897775>

### Question 229

In electrophilic aromatic substitution reactions, a phenyl substituent on the aromatic ring is \_\_\_\_\_.

- an activator and an o,p-director
- a deactivator and an o,p-director
- a deactivator and a m-director
- an activator and a m-director
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898548>

### Question 230

Draw a correct Lewis structure for tert-butyl alcohol, (CH<sub>3</sub>)<sub>3</sub>COH, including all non-bonding lone pairs.

Answer: <https://biology-forums.com/index.php?topic=1897166>

### Question 231

Provide a series of steps through which 2-methylbutane is converted into 2-methylbut-1-ene.

Answer: <https://biology-forums.com/index.php?topic=1897997>

### Question 232

What is an emulsion?

Answer: <https://biology-forums.com/index.php?topic=1900166>

### Question 233

What do we call a mixture of two immiscible liquids in which one liquid is dispersed throughout the other in small droplets?

Answer: <https://biology-forums.com/index.php?topic=1900153>

### Question 234

Arrange the carboxylic acid derivatives below in order of increasing reactivity towards nucleophilic acyl substitution.

- 3 < 2 < 1
- 1 < 2

### Question 235

Which of the following compounds is the most nucleophilic?

- BF<sub>3</sub>
- CH<sub>3</sub>SH
- H<sub>2</sub>O
- CH<sub>3</sub>CO<sub>2</sub>H
- CH<sub>3</sub>OH

Answer: <https://biology-forums.com/index.php?topic=1897790>

### Question 236

The combination of a carbonyl group and a hydroxyl group on the same carbon atom is called a \_\_\_\_\_ group.

- carboxyl
- urethane
- carboxylate
- carbamate
- carbonate

Answer: <https://biology-forums.com/index.php?topic=1898854>

### Question 237

Draw the structure of the meso form of 1,3-dichlorocyclopentane. Take particular care to indicate three-dimensional stereochemical detail properly.

Answer: <https://biology-forums.com/index.php?topic=1897723>

### Question 238

The following compound isolated from a marine sponge has been found to have anti-tubercular activity (Tet. Lett. 2007, 8851). Show how it may be constructed by an aldol reaction by drawing a structure of the starting material.

Answer: <https://biology-forums.com/index.php?topic=1899135>

### Question 239

Which of the following compounds will undergo Friedel-Crafts alkylation with  $(\text{CH}_3)_3\text{CCl}$ ,  $\text{AlCl}_3$  most rapidly?

- acetophenone
- cyanobenzene
- toluene
- benzenesulfonic acid
- iodobenzene

Answer: <https://biology-forums.com/index.php?topic=1898543>

### Question 240

The Lewis structure of trimethylamine is shown below. Draw the condensed structural formula which corresponds to this Lewis structure.

Answer: <https://biology-forums.com/index.php?topic=1897190>

### Question 241

Which of the following solvents could be described as polar and protic?

- 18-crown-6
- acetone
- ethanol
- acetonitrile
- dimethylformamide

Answer: <https://biology-forums.com/index.php?topic=1897797>

### Question 242

Can a molecule be chiral if it contains no asymmetric carbons? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1897688>

### Question 243

Secondary amines react with the nitrosonium ion to generate \_\_\_\_\_.

- anilines
- diazonium salts
- N-nitrosoamines
- imines
- oximes

Answer: <https://biology-forums.com/index.php?topic=1898828>

### Question 244

How many moles of oxygen are required in the complete combustion of 1 mole of acetylene?

- 1
- 3
- 1.5
- 2
- 2.5

Answer: <https://biology-forums.com/index.php?topic=1898210>

### Question 245

Which of the following amino acids does not contain an aromatic R-group?

- tyrosine
- tryptophan
- phenylalanine
- histidine
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899970>

### Question 246

What peptide remains after two sequential Edman degradations of the pentapeptide

- Pro-Gly
- Gly-Phe-Arg
- Pro-Gly-Phe
- Phe-Arg
- Ser-Pro-Gly

Answer: <https://biology-forums.com/index.php?topic=1900062>

### Question 247

In an exothermic reaction, are stronger bonds broken and weaker bonds formed or are weaker bonds broken and stronger bonds formed?

Answer: <https://biology-forums.com/index.php?topic=1897512>

### Question 248

When L-(+)-lyxose is treated with nitric acid, which of the following results?

- a racemic mixture of aldaric acids
- an optically active aldaric acid
- an optically inactive aldaric acid
- an optically active aldonic acid
- an optically inactive aldonic acid

Answer: <https://biology-forums.com/index.php?topic=1899901>

### Question 249

Which is the stronger acid, cyclohexanol or 2-fluorocyclohexan-1-ol?

Answer: <https://biology-forums.com/index.php?topic=1898339>

### Question 250

Describe a sequence of reactions by which (Z)-hex-3-en-1-ol can be straightforwardly prepared from but-1-yne.

Answer: <https://biology-forums.com/index.php?topic=1898280>

### Question 251

What are the products of the reaction of benzoic acid with thionyl chloride?

Answer: <https://biology-forums.com/index.php?topic=1898956>

### Question 252

What products result from the reaction of sodium propanoate with hydrobromic acid?

Answer: <https://biology-forums.com/index.php?topic=1898889>

### Question 253

The structure of uracil is shown below. What is the hybridization of the nitrogens?

Answer: <https://biology-forums.com/index.php?topic=1897254>

### Question 254

Which of the molecules below has the higher boiling point? Briefly explain your choice.

$(\text{CH}_3)_3\text{N}$  or  $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$

Answer: <https://biology-forums.com/index.php?topic=1897302>

### Question 255

An optically active D-aldopentose produced an optically active alditol upon treatment with  $\text{NaBH}_4$ . When this aldopentose was subjected to a Ruff degradation, a D-aldotetrose was generated. This aldotetrose gave an optically active aldaric acid upon oxidation with  $\text{HNO}_3$ . Use these data to provide the structure of the starting D-aldopentose.

Answer: <https://biology-forums.com/index.php?topic=1899930>

### Question 256

Which of the following alkenes will yield a meso dihalide when reacted with  $\text{Br}_2/\text{CCl}_4$  at room temperature?

- 
- 
- 
- 

• both Band D

Answer: <https://biology-forums.com/index.php?topic=1898086>

### Question 257

In the proton NMR spectra of aldehydes and ketones, the protons bonded to carbons adjacent to the carbonyl group typically fall into which of the chemical shift ranges below?

- 1.0-2.0 ppm
- 2.0-3.0 ppm
- 4.0-4.5 ppm
- 7.0-8.0 ppm
- 9.0-10.0 ppm

Answer: <https://biology-forums.com/index.php?topic=1898650>

### Question 258

Which compound has the smaller bond dissociation energy for its carbon-chlorine bond,  $\text{CH}_3\text{Cl}$  or  $(\text{CH}_3)_3\text{CCl}$ ? Explain your reasoning.

Answer: <https://biology-forums.com/index.php?topic=1897529>

### Question 259

Draw the Newman projection of the highest energy conformation that results from rotation about the C2-C3 bond of 2,2-dimethylbutane.

Answer: <https://biology-forums.com/index.php?topic=1897412>

### Question 260

What multiplicities are observed for the signals in the off-resonance decoupled  $^{13}\text{C}$  spectrum of 2-chloropropene?

- 2 singlets and a doublet
- a singlet, a doublet and a triplet
- 3 singlets
- a singlet and 2 doublets
- a singlet, a triplet, and a quartet

Answer: <https://biology-forums.com/index.php?topic=1899439>

### Question 261

What is the relative area of each peak in a quartet spin-spin splitting pattern?

- 1:3:3:1
- 1:1:1:1
- 1:4:4:1
- 1:2:1
- 1:2:2:1

Answer: <https://biology-forums.com/index.php?topic=1899336>

### Question 262

Arrange the following alkyl halides in order of increasing boiling point:

$\text{CH}_3\text{CH}_2\text{Br}$ ,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$ ,  $(\text{CH}_3)_2\text{CHBr}$ ,  $\text{CH}_3\text{CH}_2\text{F}$ .

Answer: <https://biology-forums.com/index.php?topic=1897776>

### Question 263

Which of the following statements is (are) true for the compound (3R, 4R)-3,4-dimethylhexane?

- The enantiomer of this compound is (3S, 4S)-3,4-dimethylhexane.
- This compound is chiral.
- This compound is a diastereomer of (3R, 4S)-3,4-dimethylhexane.
- all of the above
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897709>

### Question 264

Would you expect sodium chloride ( $\text{NaCl}$ ) to be highly soluble in the organic solvent hexane? Briefly explain your answer.

Answer: <https://biology-forums.com/index.php?topic=1897300>

### Question 265

If the side chain of asparagine is hydrolyzed, what amino acid is formed?

Answer: <https://biology-forums.com/index.php?topic=1899980>

### Question 266

The mass spectrum of which compound has an M+2 peak that has intensity that is about 4% of its M+ peak?

- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>Br
- (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>S
- (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>O
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>Cl
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1899298>

### Question 267

Which of the following is an acceptable way to synthesize t-butyl ethyl ether?

- treating t-butyl bromide with Hg(OAc)<sub>2</sub>
- treating t-butanol with Hg(OAc)<sub>2</sub>
- treatment of ethyl bromide with sodium t-butoxide
- treatment of t-butyl bromide with sodium ethoxide
- heating a mixture of ethanol and t-butanol in sulfuric acid

Answer: <https://biology-forums.com/index.php?topic=1899516>

### Question 268

Magnesium monoperoxyphthalate is often used as a reagent in what process?

- epoxidation
- dehydration
- Williamson ether synthesis
- halohydrin formation
- reductive amination

Answer: <https://biology-forums.com/index.php?topic=1899554>

### Question 269

Describe the fate of a molecule from introduction to detection in a mass spectrometer.

Answer: <https://biology-forums.com/index.php?topic=1899289>

### Question 270

Name the haloalkane shown.



Answer: <https://biology-forums.com/index.php?topic=1897375>

### Question 271

Name the major organic product which results when CH<sub>3</sub>CO<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub> is treated with 2 equivalents of (CH<sub>3</sub>)<sub>2</sub>CHMgBr followed by protonation with dilute acid?

Answer: <https://biology-forums.com/index.php?topic=1898382>

### Question 272

When preserving foods, sucrose is more commonly used as a sweetener than glucose. Why is this?

Answer: <https://biology-forums.com/index.php?topic=1899938>

### Question 273

The following paraminabeolide was isolated from a Formosan soft coral and has been found to have anti-inflammatory action (J. Nat. Prod. 2011, 1132). What is the lipid classification of paraminabeolide?

- terpene
- triglyceride
- prostaglandin
- steroid

Answer: <https://biology-forums.com/index.php?topic=1900190>

### Question 274

What term describes the structural relationship between cis-1,2-dimethylcyclopentane and trans-1,2-dimethylcyclopentane?

- constitutional isomers
- not isomers
- diastereomers
- conformers
- enantiomers

Answer: <https://biology-forums.com/index.php?topic=1897702>

### Question 275

Use the following structure for the two questions below.

Saquinavir Structure

Which functional group occurs more than two times in the structure of the HIV protease inhibitor drug called Saquinavir?

- carboxylic acid
- amide
- ketone
- alkene
- amine

Answer: <https://biology-forums.com/index.php?topic=1897326>

### Question 276

An unknown compound is insoluble in water but dissolves in an aqueous solution of sodium bicarbonate with a release of carbon dioxide bubbles. The compound is almost certainly \_\_\_\_\_.

- an alcohol
- an aldehyde
- a carboxylic acid
- an amine
- an alkyl chloride

Answer: <https://biology-forums.com/index.php?topic=1898886>

### Question 277

What does the term polyunsaturated mean when used to describe a triglyceride?

Answer: <https://biology-forums.com/index.php?topic=1900109>

### Question 278

In the molecule below, show how C3 is not a chirality center, but is a stereocenter.

Answer: <https://biology-forums.com/index.php?topic=1897717>

### Question 279

The Williamson ether synthesis proceeds via an \_\_\_\_\_ mechanism.

- E1
- SN2
- E2
- SN1
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898512>

### Question 280

What intermediate occurs when a ketone undergoes a Wolff-Kishner reduction?

- a semicarbazone
- a hydrazone
- a cyanohydrin
- a hydrated aldehyde
- a carboxylate

Answer: <https://biology-forums.com/index.php?topic=1898723>

### Question 281



What D-aldopentose results when D-allose undergoes a Ruff degradation?

Answer: <https://biology-forums.com/index.php?topic=1899925>

### Question 282

Explain why the free rotation about the carbon-carbon bond in CH<sub>3</sub>CH<sub>3</sub> is not present in

Answer: <https://biology-forums.com/index.php?topic=1897267>

### Question 283

Treatment of tetrahydrofuran with excess HBr results in the formation of what major organic product?

- 1-bromopentane
- 1,4-dibromobutane
- 1,2-dibromobutane
- 1,5-dibromopentane
- 1-bromobutane

Answer: <https://biology-forums.com/index.php?topic=1899538>

### Question 284

Explain why -OCH<sub>3</sub> is a stronger activator than -OCOCH<sub>3</sub>.

Answer: <https://biology-forums.com/index.php?topic=1898569>

### Question 285

Which of the following terms best describes a Diels-Alder reaction?

- a sigmatropic rearrangement
- a [4+2] cycloaddition
- a 1,3-dipolar cycloaddition
- a substitution reaction
- a [2+2] cycloaddition

Answer: <https://biology-forums.com/index.php?topic=1899649>

### Question 286

Which of the following oils is the least polyunsaturated?

- olive oil
- corn oil
- soybean oil
- canola oil
- linseed oil

Answer: <https://biology-forums.com/index.php?topic=1900123>

### Question 287

Show how propyl cyclopentyl ether can be prepared starting with cyclopentene and using an alkoxymercuration-demercuration route.

Answer: <https://biology-forums.com/index.php?topic=1899527>

### Question 288

What combination of reagents can be used in a Grignard-based synthesis of 1-propylcyclohexanol?

Answer: <https://biology-forums.com/index.php?topic=1898373>

### Question 289

Propose a synthesis of 3-methylhept-4-yn-3-ol from but-1-yne.

Answer: <https://biology-forums.com/index.php?topic=1898688>

### Question 290

Which of the following reagents will quantitatively convert an enolizable ketone to its enolate salt?

- methyllithium
- lithium hydroxide
- lithium diisopropylamide
- diethylamine
- pyridine

Answer: <https://biology-forums.com/index.php?topic=1899082>

### Question 291

Absorption of what type of electromagnetic radiation results in transitions among allowed vibrational motions?

- ultraviolet light
- microwaves
- infrared light
- radio waves
- X-rays

Answer: <https://biology-forums.com/index.php?topic=1899211>

### Question 292

\_\_\_\_\_ are isomers which have the same bonding sequence but differ in the orientation of their atoms in space.

Answer: <https://biology-forums.com/index.php?topic=1897605>

### Question 293

Which of the following compounds is (are) appropriate to promote the cationic polymerization of isobutylene?

- ROOR
- NaOH
- H<sub>2</sub>SO<sub>4</sub>
- BF<sub>3</sub>
- both H<sub>2</sub>SO<sub>4</sub> and BF<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1898131>

### Question 294

Which of the following compounds will not undergo Friedel-Crafts acylation when treated with

- p-xylene
- toluene
- anisole
- benzophenone
- ethoxybenzene

Answer: <https://biology-forums.com/index.php?topic=1898558>

### Question 295

What are the expected products of the reaction of PhOCH<sub>3</sub> with concentrated HI?

- iodobenzene and iodomethane
- phenol and iodomethane
- iodobenzene and methanol
- phenol and methanol

Answer: <https://biology-forums.com/index.php?topic=1899536>

### Question 296

Draw and name all terminal alkynes with molecular formula C<sub>5</sub>H<sub>8</sub>.

Answer: <https://biology-forums.com/index.php?topic=1898151>

### Question 297

Which of the following is another name for cyclobutadiene?

- Dewar benzene
- antibenzene
- [2]annulene
- [4]annulene
- [6]annulene

Answer: <https://biology-forums.com/index.php?topic=1899726>

### Question 298

Which of the following reactions will result in the formation of a secondary alcohol(s) in good yield?

- 
- 
- 
-

- both A and D

Answer: <https://biology-forums.com/index.php?topic=1898402>

### Question 299

Complete the short synthesis below by providing the necessary reagents.

Answer: <https://biology-forums.com/index.php?topic=1898241>

### Question 300

Which formula best characterizes hard-water scum?

- $\text{CH}_3(\text{CH}_2)_{16}\text{CO}_2\text{Na}$
- $[\text{CH}_3(\text{CH}_2)_{16}\text{CO}_2]_2\text{Ca}$
- $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCH}_2\text{CH}_2\text{CH}_2\text{CO}_2\text{H}$
- $\text{CH}_3(\text{CH}_2)_{16}\text{SO}_3\text{Na}$
- $\text{CH}_3(\text{CH}_2)_{16}\text{CO}_2\text{H}$

Answer: <https://biology-forums.com/index.php?topic=1900160>

### Question 301

Which of the following statements is the best statement of the Hammond Postulate?

- Related species that are similar in energy are also similar in structure.
- The structure of the transition state in an organic reaction is always modeled on the structure of the reactants leading to that transition state.
- Transition states are molecular species of finite lifetime whose properties can be probed through free radical reactions.
- In an endothermic reaction, the transition state is closer to the reactants in structure.
- In an exothermic reaction, the transition state is closer in energy to the products.

Answer: <https://biology-forums.com/index.php?topic=1897583>

### Question 302

Provide a step-by-step mechanism for the reaction below. Include all intermediates, formal charges and correct arrow pushing of electrons.

Answer: <https://biology-forums.com/index.php?topic=1897845>

### Question 303

Draw the form of L-tryptophan which is present at biological pH, pH = 7.4.

Answer: <https://biology-forums.com/index.php?topic=1900000>

### Question 304

How many elements of unsaturation do molecules with a molecular formula of  $\text{C}_8\text{H}_4\text{N}_2$  have?

- 2
- 4
- 6
- 8
- 10

Answer: <https://biology-forums.com/index.php?topic=1897899>

### Question 305

Which of the following compounds would reduce a disulfide linkage in a peptide?

- dilute HCl
- concentrated NaOH
- dithiothreitol
- urea
- bromine

Answer: <https://biology-forums.com/index.php?topic=1900052>

### Question 306

Write a detailed, stepwise mechanism for the following reaction.

Answer: <https://biology-forums.com/index.php?topic=1897494>

### Question 307

Carbon-carbon single bonds tend to be \_\_\_\_\_ and \_\_\_\_\_ than carbon-carbon double bonds.

- shorter; weaker
- longer; stronger
- shorter; stronger
- longer; weaker

Answer: <https://biology-forums.com/index.php?topic=1897888>

### Question 308

Linear alkanes generally have higher phase transitions than their branched isomers. However, the melting point of cyclohexane is 6° C while the melting point of hexane is -95° C. Briefly suggest a reason why this is.

Answer: <https://biology-forums.com/index.php?topic=1897401>

### Question 309

Which of the following alkenes is the major product when 2-bromo-2-methylpentane is treated with sodium ethoxide in ethanol?

- 4-methylpent-1-ene
- (E)-4-methylpent-2-ene
- 2-methylpent-1-ene
- 2-methylpent-2-ene
- (Z)-4-methylpent-2-ene

Answer: <https://biology-forums.com/index.php?topic=1897974>

### Question 310

Provide the single reagent necessary for the conversion of cyclobutanone to the compound shown below.

Answer: <https://biology-forums.com/index.php?topic=1898690>

### Question 311

When 3-bromo-1-methylcyclohexene is heated in a good ionizing solvent, reactions occur through a carbocation intermediate. Draw all reasonable resonance contributors of this cation and indicate which is the major contributor.

Answer: <https://biology-forums.com/index.php?topic=1899612>

### Question 312

Draw the structure of piperidine.

Answer: <https://biology-forums.com/index.php?topic=1898746>

### Question 313

Given an activation energy of 15 kcal/mol, use the Arrhenius equation to estimate how much faster the reaction will occur if the temperature is increased from

Answer: <https://biology-forums.com/index.php?topic=1897555>

### Question 314

Which element in the second row of the periodic table has six valence electrons and a valence of two?

Answer: <https://biology-forums.com/index.php?topic=1897099>

### Question 315

Can the two compounds be separated by distillation? Why or why not?

(1S,2S,3R,5S)-Pinanediol and (1S,2R,3R,5R)-Pinanediol

Answer: <https://biology-forums.com/index.php?topic=1897725>

### Question 316

Which of the structures shown below is consistent with the C-13 NMR (off resonance splitting for each peak is shown as a table within the figure) and H-NMR spectra? (formula = C<sub>9</sub>H<sub>11</sub>OBr)

- 
- 
- 
- 
-

Answer: <https://biology-forums.com/index.php?topic=1899433>

### Question 317

Starting from methylpropane, how could you make methyl isobutyrate?

Answer: <https://biology-forums.com/index.php?topic=1899055>

### Question 318

What is a trans fat and how are they usually formed?

Answer: <https://biology-forums.com/index.php?topic=1900129>

### Question 319

Which of the following is an intermediate when 1,2-dibromo-4-nitrobenzene is heated with NaOH in a nucleophilic aromatic substitution reaction?

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1898605>

### Question 320

Fructose forms \_\_\_\_\_.

- a six-membered lactone
- a five-membered cyclic hemiacetal
- a six-membered cyclic hemiacetal
- a five-membered lactone
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899870>

### Question 321

Provide the structure of the more stable enol tautomer of 1-phenyl-2-octanone.

Answer: <https://biology-forums.com/index.php?topic=1899092>

### Question 322

When pentanal reacts with ethylamine under conditions of acid catalysis, the major organic product is \_\_\_\_\_.

- an oxime
- a ketone
- a hydrazone
- a nitrile
- an imine

Answer: <https://biology-forums.com/index.php?topic=1898791>

### Question 323

Give two properties of ethers which allow them to be commonly used as solvents in organic reactions.

Answer: <https://biology-forums.com/index.php?topic=1899484>

### Question 324

Draw condensed structures for the four compounds with formula C<sub>3</sub>H<sub>9</sub>N.

Answer: <https://biology-forums.com/index.php?topic=1897116>

### Question 325

What two alkenes, which contain only one double bond, yield exclusively propanoic acid upon oxidation with hot concentrated KMnO<sub>4</sub>?

Answer: <https://biology-forums.com/index.php?topic=1898922>

### Question 326

The mass spectrum of which compound has M<sup>+</sup> and M+2 peaks of approximately equal intensity?

- 3-pentanol
- 3-iodopentane
- pentane

- 3-bromopentane
- 3-chloropentane

Answer: <https://biology-forums.com/index.php?topic=1899296>

### Question 327

Which of the following correctly lists the conformations of cis-1,4-di-t-butylcyclohexane in order of increasing energy?

- twist boat < boat < chair < half-chair
- half-chair < chair < boat < twisted boat
- chair < twist boat < half-chair < boat
- boat < chair < twisted boat < half-chair
- chair < boat < twist boat < half-chair

Answer: <https://biology-forums.com/index.php?topic=1897464>

### Question 328

Which of the following oils has the highest composition of one single fatty acid?

- soybean oil
- canola oil
- herring oil
- olive oil

Answer: <https://biology-forums.com/index.php?topic=1900124>

### Question 329

Arrange the following substrates in order of their increasing SN2 reactivity with NaCN:

bromoethane, 1-chloro-3,3-dimethylpentane, 1-chloro-2,2-dimethylpentane, and 2-bromo-2-methylpentane.

Answer: <https://biology-forums.com/index.php?topic=1897801>

### Question 330

The protons marked Ha and Hb in the molecule below are \_\_\_\_\_.

- endotopic
- diastereotopic
- enantiotopic
- chemically equivalent
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899349>

### Question 331

Name the product which results when 1-methylcyclohexanol is treated with DMP reagent.

Answer: <https://biology-forums.com/index.php?topic=1898436>

### Question 332

Define lipid.

Answer: <https://biology-forums.com/index.php?topic=1900090>

### Question 333

The compound methylamine, CH<sub>3</sub>NH<sub>2</sub>, contains a C-N bond. In this bond, which of the following best describes the charge on the carbon atom?

- +1
- slightly positive
- neutral
- slightly negative
- -1

Answer: <https://biology-forums.com/index.php?topic=1897109>

### Question 334

Ethanol that contains added impurities that make it unfit for drinking is described as \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1898330>

### Question 335

Rank the following carbocations in order of stability. (The most stable is first.)

- II > I > III

- III > I > II
- I > III > II
- I > II > III

Answer: <https://biology-forums.com/index.php?topic=1897554>

### Question 336

Draw the Fischer projection of L-glutamic acid at a pH of 12.

Answer: <https://biology-forums.com/index.php?topic=1899998>

### Question 337

Write the complete, balanced equation for the combustion of 2-pentyne.

Answer: <https://biology-forums.com/index.php?topic=1898211>

### Question 338

Provide a structural representation of 2-ethoxypentane.

Answer: <https://biology-forums.com/index.php?topic=1899488>

### Question 339

How many asymmetric carbons are present in the compound below?

Answer: <https://biology-forums.com/index.php?topic=1897638>

### Question 340

Draw the products which would result if poly(ethylene terephthalate) were hydrolyzed in hot aqueous NaOH.

Answer: <https://biology-forums.com/index.php?topic=1900319>

### Question 341

Provide a series of synthetic steps by which  $(\text{CH}_3)_2\text{CCH}_2$  could be prepared from 2-methylpropane.

Answer: <https://biology-forums.com/index.php?topic=1897857>

### Question 342

When tert-butanol is heated in sulfuric acid, why is the major product the elimination product and not the ether (substitution product)?

Answer: <https://biology-forums.com/index.php?topic=1898490>

### Question 343

A newly isolated natural product was shown to be optically active. If a solution of 2.0 g in 10 mL of ethanol in a 50 cm tube gives a rotation of  $+2.57^\circ$ , what is the specific rotation of this natural product?

Answer: <https://biology-forums.com/index.php?topic=1897680>

### Question 344

Clonazepam (TM) is used to treat seizures and panic disorders and is shown below. Are there any aromatic hydrocarbons in the molecule? If so, circle them.

Answer: <https://biology-forums.com/index.php?topic=1897308>

### Question 345

The Lewis structure of pentane is shown below. Draw the condensed structural formula which corresponds to this Lewis structure.

Answer: <https://biology-forums.com/index.php?topic=1897191>

### Question 346

Which of the following compounds will react least rapidly when treated with  $\text{CH}_3\text{CH}_2\text{Cl}$  and  $\text{AlCl}_3$ ?

- o-xylene
- bromobenzene
- acetanilide
- benzene
- toluene

Answer: <https://biology-forums.com/index.php?topic=1898560>

### Question 347

When drawing a peptide, the N-terminus \_\_\_\_\_.

- is drawn on the right side
- is drawn on the left side
- is drawn as -NH<sub>2</sub>
- B and C are both correct

Answer: <https://biology-forums.com/index.php?topic=1900043>

### Question 348

Which of the following lipids is an example of a simple lipid?

- oil
- fat
- wax
- terpene
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900087>

### Question 349

Which of the following is the best choice of reagents to effect the electrophilic iodination of an aromatic ring?

- I<sub>2</sub>, HNO<sub>3</sub>
- KI, acetone
- I<sub>2</sub>, CH<sub>3</sub>CN
- KI, HNO<sub>3</sub>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898532>

### Question 350

Draw an acceptable structure for (S)-5-phenyloct-2-yne.

Answer: <https://biology-forums.com/index.php?topic=1898200>

### Question 351

Draw a line-angle formula for (CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>.

Answer: <https://biology-forums.com/index.php?topic=1897189>

### Question 352

How many molecules of fatty acid are needed to make one molecule of a cephalin?

- 1
- 1.5
- 0
- 3
- 2

Answer: <https://biology-forums.com/index.php?topic=1900171>

### Question 353

Draw the LUMO of 1,3-butadiene.

Answer: <https://biology-forums.com/index.php?topic=1899604>

### Question 354

The reagent which converts a carbonyl group of a ketone into a methylene group is \_\_\_\_\_.

- NaBH<sub>4</sub>, CH<sub>3</sub>CH<sub>2</sub>OH
- LiAlH<sub>4</sub>
- LiAlH[OC(CH<sub>3</sub>)<sub>3</sub>]<sub>3</sub>
- Na, NH<sub>3</sub>, CH<sub>3</sub>CH<sub>2</sub>OH
- Zn(Hg), conc. HCl

Answer: <https://biology-forums.com/index.php?topic=1898724>

### Question 355

What type of polymer is formed from ethylene glycol and a diester as monomer components?



- polyamides
- polyesters
- polycarbonates
- polyurethanes
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900286>

### Question 356

When (R)-butan-2-ol is treated with TsCl in pyridine, the product formed is \_\_\_\_\_.

- a racemic mixture
- a single enantiomer
- a mixture of diastereomers
- an achiral compound
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898451>

### Question 357

The protons marked Ha and Hb in the molecule below are \_\_\_\_\_.

- endotopic
- enantiotopic
- diastereotopic
- chemically equivalent
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899350>

### Question 358

When a molecule can best be represented as a series of resonance forms, each of these forms always contributes to the same degree in the hybrid.

- true
- false

Answer: <https://biology-forums.com/index.php?topic=1897115>

### Question 359

Which bond in the structure below would give rise to the highest absorption frequency in an IR spectrum?

- C=C
- C-D
- C sp<sup>3</sup>-H
- C sp<sup>2</sup>-H

Answer: <https://biology-forums.com/index.php?topic=1899210>

### Question 360

In IR spectroscopy, the C—O bond has a \_\_\_\_\_ frequency than the C—N bond because \_\_\_\_\_.

- higher; an O atom has more electronegativity than an N atom
- lower; an O atom has more mass than an N atom
- higher; an O atom has more mass than an N atom
- higher; an O atom has an even number of neutrons
- lower; an O atom has more electronegativity than an N atom

Answer: <https://biology-forums.com/index.php?topic=1899218>

### Question 361

Provide the line-angle formula for CH<sub>3</sub>CH<sub>2</sub>C(CH<sub>3</sub>)<sub>2</sub>CH<sub>2</sub>CHO

Answer: <https://biology-forums.com/index.php?topic=1897209>

### Question 362

Why does CH<sub>2</sub>CHCHBrCH<sub>3</sub> undergo solvolysis much more rapidly than 2-bromobutane?

Answer: <https://biology-forums.com/index.php?topic=1897843>

### Question 363

Which compound would show a larger than usual M+2 peak in the mass spectrum?

- CH<sub>3</sub>CH<sub>2</sub>CO<sub>2</sub>H

- CH<sub>3</sub>CH<sub>2</sub>SCH<sub>3</sub>
- CH<sub>3</sub>(CH<sub>2</sub>)<sub>2</sub>CH<sub>3</sub>
- (CH<sub>3</sub>)<sub>2</sub>CHNH<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1899291>

### Question 364

Which proton is the most acidic in the compound below?

- 1
- 2
- 3
- They are all the same acidity.

Answer: <https://biology-forums.com/index.php?topic=1897215>

### Question 365

Draw a splitting tree to show the complex splitting pattern for the H<sub>b</sub> proton. (J<sub>cis</sub> = 10 Hz, J<sub>trans</sub> = 15 Hz and J<sub>gem</sub> = 2 Hz)

Answer: <https://biology-forums.com/index.php?topic=1899366>

### Question 366

Translate the structure below to a Fischer projection.

Answer: <https://biology-forums.com/index.php?topic=1897694>

### Question 367

How many diastereomers are there of the molecule shown below?

- 2
- 1
- 0
- 6
- 3

Answer: <https://biology-forums.com/index.php?topic=1897697>

### Question 368

Provide the structure of o-toluic acid.

Answer: <https://biology-forums.com/index.php?topic=1899801>

### Question 369

Provide the structure of o-bromostyrene.

Answer: <https://biology-forums.com/index.php?topic=1899813>

### Question 370

Draw an acceptable structure for 4-ethylhept-1-ene.

Answer: <https://biology-forums.com/index.php?topic=1897910>

### Question 371

Which of the following alkyl bromides undergoes solvolysis in aqueous methanol most rapidly?

- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>Br
- PhCHBrCH<sub>3</sub>
- (CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>CH<sub>2</sub>Br
- (CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>CHBrCH<sub>3</sub>
- PhBr

Answer: <https://biology-forums.com/index.php?topic=1897818>

### Question 372

Millad NX8000, shown below, is a clarifying additive for polypropylene (C & En News, Sept. 2010, 34). Predict the products of the following reaction.

Answer: <https://biology-forums.com/index.php?topic=1898722>

### Question 373

Which has the higher speed in a vacuum, ultraviolet or infrared light?

Answer: <https://biology-forums.com/index.php?topic=1899204>

### Question 374

In what units are frequency values typically given?

Answer: <https://biology-forums.com/index.php?topic=1899195>

### Question 375

Draw a Newman Projection along the C3-C4 for the molecule shown below. (C3 should be in front.)

Answer: <https://biology-forums.com/index.php?topic=1897474>

### Question 376

How many elements of unsaturation do molecules with a molecular formula of  $C_6H_6Cl_6$  have?

- 0
- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1897898>

### Question 377

Provide the major resonance structures of the intermediate sigma complex in the reaction of benzene with the generic electrophile  $E^+$ .

Answer: <https://biology-forums.com/index.php?topic=1898527>

### Question 378

\_\_\_\_\_, commonly used in automobile antifreezes, is a diol which is highly toxic if ingested.

Answer: <https://biology-forums.com/index.php?topic=1898296>

### Question 379

If the mass spectrum of chlorobenzene shows a peak with an  $m/z$  value of 114, having an abundance of 15%, calculate the  $m/z$  value and approximate abundance of the molecular ion peak.

Answer: <https://biology-forums.com/index.php?topic=1899300>

### Question 380

The presence of what product of the autooxidation of ethers makes the distillation of ethers dangerous?

Answer: <https://biology-forums.com/index.php?topic=1899541>

### Question 381

What is the difference between a soap and detergent?

Answer: <https://biology-forums.com/index.php?topic=1900186>

### Question 382

How many hydrocarbon tails are typically present in a phospholipid molecule?

- 0
- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1900176>

### Question 383

Draw the structure of any hydrocarbon alkane which contains 5 carbon atoms.

Answer: <https://biology-forums.com/index.php?topic=1897309>

### Question 384

Provide the structure of N,N-diethylbutanamide.

Answer: <https://biology-forums.com/index.php?topic=1898981>

### Question 385

Explain why phenol is about 106 times more acidic than methanol. Use appropriate resonance structures as part of your explanation.

Answer: <https://biology-forums.com/index.php?topic=1898342>

### Question 386

The following [3+2] cycloaddition was reported in Organic Letters, 2011, 402. Predict whether the reaction would be thermally or photochemically promoted. Justify your answer by showing overlap of the correct molecular orbitals. Assume the alkene is the electrophile.

Answer: <https://biology-forums.com/index.php?topic=1899693>

### Question 387

How could you synthesize 3-phenylpentan-3-ol from benzoic acid?

Answer: <https://biology-forums.com/index.php?topic=1899076>

### Question 388

Provide a representation of atactic poly(acrylonitrile).

Answer: <https://biology-forums.com/index.php?topic=1900265>

### Question 389

Which of the following fatty acids has the lowest melting point?

- palmitic acid
- lauric acid
- myristic acid
- stearic acid
- linoleic acid

Answer: <https://biology-forums.com/index.php?topic=1900122>

### Question 390

What occurs when an aqueous solution of sodium stearate is treated with a solution of calcium ions?

Answer: <https://biology-forums.com/index.php?topic=1900163>

### Question 391

A branched alkane has \_\_\_\_\_ boiling point relative to the isomeric linear alkane. There are \_\_\_\_\_ London force interactions in the branched alkane.

- a lower; stronger
- a higher; stronger
- the same; similar
- a higher; weaker
- a lower; weaker

Answer: <https://biology-forums.com/index.php?topic=1897387>

### Question 392

The hydrogen atom abstraction step in the free radical chlorine of methane is exothermic. Use the Hammond Postulate to speculate on the extent of bond formation and bond cleavage in the transition state.

Answer: <https://biology-forums.com/index.php?topic=1897587>

### Question 393

Nylon 6 is a \_\_\_\_\_.

- polycarbonate
- polyester
- polyurethane
- polyamide
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900284>

### Question 394

Which of the following substrates will not form a Grignard reagent when treated with Mg/diethylether?

- 
- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1898389>

### Question 395

When L-(+)-idose is treated with bromine water, which of the following results?

- a racemic mixture of aldaric acids
- an optically active aldaric acid
- an optically inactive aldaric acid
- an optically active aldonic acid
- an optically inactive aldonic acid

Answer: <https://biology-forums.com/index.php?topic=1899903>

### Question 396

Amides are less basic than amines because \_\_\_\_\_.

- the carbonyl group donates electrons by resonance
- amides do not contain nitrogen
- the carbonyl group withdraws electrons by resonance
- the nitrogen does not have a lone pair of electrons
- the nitrogen has a full positive charge

Answer: <https://biology-forums.com/index.php?topic=1898960>

### Question 397

Bradykinin is a nonapeptide released by globulins in the blood in response to a wasp sting. Hydrolysis gives the following amino acids: 2 Arg, Gly, 2 Phe, 3 Pro, and Ser. Edman degradation gives phenylthiohydantoin of Arg. Cleavage with carboxypeptidase gives Arg. Partial hydrolysis gives the following di- and tripeptides: Phe-Ser, Pro-Gly-Phe, Pro-Pro, Ser-Pro-Phe, Phe-Arg, and Arg-Pro. What is the amino acid sequence of bradykinin?

Answer: <https://biology-forums.com/index.php?topic=1900067>

### Question 398

Would a 50:50 mixture of (2R,3R)-2,3-dibromobutane and (2R,3S)-2,3-dibromobutane be optically active? Explain.

Answer: <https://biology-forums.com/index.php?topic=1897676>

### Question 399

\_\_\_\_\_ is the minimum kinetic energy reacting molecules must possess to overcome the repulsions between their electron clouds when they collide.

Answer: <https://biology-forums.com/index.php?topic=1897540>

### Question 400

The major monobrominated product which results when ethylcyclohexane is subjected to free radical bromination is \_\_\_\_\_.

- a secondary bromide
- a tertiary bromide
- a quaternary bromide
- bromomethane
- a primary bromide

Answer: <https://biology-forums.com/index.php?topic=1897561>

### Question 401

Using 1H NMR, how would you tell the two esters apart?

Answer: <https://biology-forums.com/index.php?topic=1899001>

### Question 402

This ether can be synthesized two ways using an alkoxymercuration/demercuration reaction. What are the two alkene starting materials that could be used?

Answer: <https://biology-forums.com/index.php?topic=1899508>

### Question 403

Give the IUPAC name for HCCCH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>.

Answer: <https://biology-forums.com/index.php?topic=1898141>

### Question 404

Some ethers can be prepared by heating the appropriate alcohol in the presence of sulfuric acid. Can di-sec-butyl ether be prepared from sec-butanol by this route? Explain your answer.

Answer: <https://biology-forums.com/index.php?topic=1899534>

### Question 405

Which amino acid's side chain is positively charged at biological pH, pH = 7.4?

- glutamine
- aspartic acid
- arginine
- tyrosine
- serine

Answer: <https://biology-forums.com/index.php?topic=1899986>

### Question 406

Draw the structure of (1R, 2S, 3S)-1,2-dibromo-3-ethylcyclohexane. Take particular care to indicate stereochemistry properly.

Answer: <https://biology-forums.com/index.php?topic=1897662>

### Question 407

Any process faster than \_\_\_\_\_ will be recorded as an average by NMR spectroscopy.

- 0.001 seconds
- 0.01 seconds
- 1 minute
- 0.1 seconds
- 0.0005 seconds

Answer: <https://biology-forums.com/index.php?topic=1899353>

### Question 408

Which compound has the smallest heat of hydrogenation?

- 5-methyl-1,2-hexadiene
- 5-methyl-1,4-hexadiene
- (E)-5-methyl-1,3-hexadiene
- 2-methyl-1,5-hexadiene
- (E)-2-methyl-2,4-hexadiene

Answer: <https://biology-forums.com/index.php?topic=1899580>

### Question 409

Absorption \_\_\_\_\_ is the measurement of the amount of light absorbed by a compound as a function of the wavelength of light.

Answer: <https://biology-forums.com/index.php?topic=1899191>

### Question 410

The chair form of cyclohexane has protons in two distinct environments, axial and equatorial. When the proton NMR of cyclohexane is run on a 100-MHz instrument at 23°C, only one signal for the compound is observed. Explain this apparent contradiction.

Answer: <https://biology-forums.com/index.php?topic=1899356>

### Question 411

What reagent can be used to convert benzophenone into triphenylmethanol?

Answer: <https://biology-forums.com/index.php?topic=1898678>

### Question 412

Nitrogen's lone pair electrons occupy what type of orbital in pyridine?

- sp<sup>3</sup>
- s
- sp<sup>2</sup>
- p
- sp

Answer: <https://biology-forums.com/index.php?topic=1899760>

### Question 413

Draw an acceptable structure for hepta-3,6-dien-1-yne.

Answer: <https://biology-forums.com/index.php?topic=1898201>

### Question 414

A student proposed to make aspartic acid from succinic acid using Br<sub>2</sub>/PBr<sub>3</sub>, then adding a large excess of NH<sub>3</sub>. Why might this synthesis not work?

Answer: <https://biology-forums.com/index.php?topic=1900036>

### Question 415

The monochlorination of butane with chlorine gas under photolysis will give two products. Draw both of them and then predict the product ratio.

Answer: <https://biology-forums.com/index.php?topic=1897495>

### Question 416

If the side groups of a polymer chain are generally on the same side of the polymer backbone, the polymer is called \_\_\_\_\_.

- transiotactic
- cisisotactic
- syndiotactic
- isotactic
- atactic

Answer: <https://biology-forums.com/index.php?topic=1900254>

### Question 417

Provide the IUPAC name for (CH<sub>3</sub>)<sub>3</sub>CCH<sub>2</sub>CHClCH<sub>2</sub>CHO.

Answer: <https://biology-forums.com/index.php?topic=1898634>

### Question 418

Which functional groups below indicate the presence of two atoms connected by a triple bond?

- alkyne
- alkene
- nitrile
- ester
- both A and C

Answer: <https://biology-forums.com/index.php?topic=1897306>

### Question 419

The product of the reaction below has been found to be a potent anticancer agent (J. Med. Chem. 2010, 6867). Predict the structure of the product of the following reaction.

Answer: <https://biology-forums.com/index.php?topic=1898817>

### Question 420

Provide the IUPAC name of (CH<sub>3</sub>CH<sub>2</sub>)<sub>3</sub>CH.

Answer: <https://biology-forums.com/index.php?topic=1897364>

### Question 421

In the formation of the following ether, which reaction is preferred and why?

- Reaction A is preferred because the the formation of the carbocation would be stabilized in the benzylic position.

- Reaction B is preferred because the oxidation step works best for primary alcohols.
- Reaction A is preferred over reaction B because the smaller methyl iodide would make a better nucleophilic target.
- Reaction B would be preferred because iodine is a better leaving group for the SN1 reaction.
- There is no difference in these two reactions — they would give approximately the same yields.

Answer: <https://biology-forums.com/index.php?topic=1898517>

### Question 422

When an aldehyde is treated with LiAlH<sub>4</sub> followed by addition of H<sub>2</sub>O, what general class of product results?

- ketone
- secondary alcohol
- tertiary alcohol
- primary alcohol
- ether

Answer: <https://biology-forums.com/index.php?topic=1898395>

### Question 423

Provide a picture of the HOMO of 1,3,5-hexatriene.

Answer: <https://biology-forums.com/index.php?topic=1899687>

### Question 424

Provide the structures of the major organic products which result when tristearin (shown below) is heated in aqueous solution of sodium hydroxide.

Answer: <https://biology-forums.com/index.php?topic=1900157>

### Question 425

Provide a structural representation of 3-ethylfuran.

Answer: <https://biology-forums.com/index.php?topic=1899497>

### Question 426

What two D-aldohexoses result when D-arabinose is subjected to the Kiliani-Fischer synthesis?

Answer: <https://biology-forums.com/index.php?topic=1899934>

### Question 427

Which of the following best describes the geometry about the carbon-carbon double bond in the alkene below?

- \* E
- \* Z
- \* neither E nor Z

Answer: <https://biology-forums.com/index.php?topic=1897930>

### Question 428

Structures \_\_\_\_\_, shown below, are resonance structures, and structure \_\_\_\_\_ is the major contributor to the overall resonance hybrid.

- 1, 3 & 5; 3
- 2 & 4; 2
- 1, 3, 4 & 5; 3
- 4 & 6; 6
- 1, 3 & 5; 1

Answer: <https://biology-forums.com/index.php?topic=1897182>

### Question 429

The trans isomers of cycloalkenes with rings containing fewer than \_\_\_\_\_ atoms are unstable at room temperature.

Answer: <https://biology-forums.com/index.php?topic=1897953>

### Question 430

Of the two C-H bonds shown, which has the smaller bond dissociation energy? Explain your choice.



(CH<sub>3</sub>)<sub>2</sub>CH-H vs. CH<sub>3</sub>CH<sub>2</sub>-H

Answer: <https://biology-forums.com/index.php?topic=1897535>

### Question 431

Compound I has a molecular formula of C<sub>7</sub>H<sub>16</sub>. In <sup>13</sup>C NMR, compound I gave 3 peaks and in <sup>1</sup>H NMR it also gave 3 peaks, a doublet, a triplet and a multiplet. Provide a structure for compound I.

Answer: <https://biology-forums.com/index.php?topic=1899434>

### Question 432

What series of synthetic steps could be used to prepare 1-bromopentane from 1-bromopropane?

Answer: <https://biology-forums.com/index.php?topic=1898477>

### Question 433

Provide an equation which relates the energy of a photon to its wavelength.

Answer: <https://biology-forums.com/index.php?topic=1899196>

### Question 434

By using the appropriate molecular formulas, write a balanced equation which describes the complete combustion of cyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897403>

### Question 435

Provide a series of synthetic steps by which 2-bromo-4-nitrobenzoic acid can be prepared from toluene.

Answer: <https://biology-forums.com/index.php?topic=1898612>

### Question 436

Name two of the three common allotropes of carbon.

Answer: <https://biology-forums.com/index.php?topic=1899785>

### Question 437

When drawing a peptide, the C-terminus \_\_\_\_\_.

- is drawn on the right side
- is drawn on the left side
- is drawn as -COO-
- A and C are both correct

Answer: <https://biology-forums.com/index.php?topic=1900044>

### Question 438

Compounds that rotate the plane of polarized light clockwise are called \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897671>

### Question 439

Which of the molecules below can hydrogen bond to another of the same compound?

- CH<sub>3</sub>CH<sub>2</sub>COCH<sub>2</sub>CH<sub>3</sub>
- (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>CHOH
- CH<sub>3</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>3</sub>
- CH<sub>3</sub>CH<sub>2</sub>COOCH<sub>3</sub>
- all of the above

Answer: <https://biology-forums.com/index.php?topic=1897296>

### Question 440

Provide a structure of the dipeptide Ala-Ser.

Answer: <https://biology-forums.com/index.php?topic=1900041>

### Question 441

Why is Fourier transform NMR spectroscopy preferred over continuous wave as a technique for

Answer: <https://biology-forums.com/index.php?topic=1899461>

### Question 442

What is the relationships between Ha and Hb in the following structure?

- diastereotopic
- enantiotopic
- homeotopic
- none of the previous

Answer: <https://biology-forums.com/index.php?topic=1899348>

### Question 443

In a 1-butanol molecule, what part of the molecule is described as hydrophilic?

Answer: <https://biology-forums.com/index.php?topic=1898324>

### Question 444

Which sequence correctly ranks the following dienes in order of increasing reactivity in the Diels-Alder reaction?

- 3 < 1 < 2
- 2 < 3 < 1
- 1 < 2 < 3
- 3 < 2 < 1

Answer: <https://biology-forums.com/index.php?topic=1899668>

### Question 445

A node is a region of high electron density between the two atoms in a covalent bond.

- true
- false

Answer: <https://biology-forums.com/index.php?topic=1897094>

### Question 446

UV spectroscopy measures the energy required to promote an electron from the \_\_\_\_\_ molecular orbital to the \_\_\_\_\_ molecular orbital.

- highest occupied, lowest unoccupied
- lowest occupied, highest unoccupied
- highest occupied, highest unoccupied
- lowest occupied, lowest unoccupied
- None of the above

Answer: <https://biology-forums.com/index.php?topic=1899696>

### Question 447

Provide a detailed, stepwise mechanism for the acid-catalyzed reaction of 2-butanone with ethylene glycol (HOCH<sub>2</sub>CH<sub>2</sub>OH) to produce an acetal.

Answer: <https://biology-forums.com/index.php?topic=1898719>

### Question 448

Besides a possible difference in base structure, what is the major structural difference between ribo- and deoxyribonucleosides?

Answer: <https://biology-forums.com/index.php?topic=1899956>

### Question 449

Which of the following statements is a correct description of the most stable conformation of 1,1,3-trimethylcyclohexane?

- The methyl group at C-3 is equatorial.
- C-1 is a tertiary carbon and C-3 is a primary carbon.
- C-1 is a quaternary carbon and C-3 is a secondary carbon.
- Both methyl groups at C-1 are equatorial.
- C-1 is a tertiary carbon and C-3 is a secondary carbon.

Answer: <https://biology-forums.com/index.php?topic=1897448>

### Question 450

Name the compound shown below.

- (2R,4S)-4-ethylheptane-2-thiol
- (2S,4R)-4-propylhexane-2-thiol
- (2R,4S)-4-propylhexane-2-thiol
- (2S,4R)-4-ethylheptane-2-thiol

Answer: <https://biology-forums.com/index.php?topic=1898318>

### Question 451

How many nodes, other than the node coincident with the molecular plane, are present in the HOMO of 1,3,5-hexatriene?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1899698>

### Question 452

Using Zaitsev's rule, choose the most stable alkene among the following.

- 1,6-dimethylcyclohexene
- cis-3,4-dimethylcyclohexene
- 1,2-dimethylcyclohexene
- They are all of equal stability according to Zaitsev's rule.

Answer: <https://biology-forums.com/index.php?topic=1897947>

### Question 453

Explain why the compound below is unsuitable as a starting material to form a Grignard reagent.

Answer: <https://biology-forums.com/index.php?topic=1898390>

### Question 454

Which of the following alkenes has the smallest molar heat of hydrogenation (ie, releases the least heat upon hydrogenation)?

- 1-hexene
- cis-2-butene
- 2,3-dimethyl-2-butene
- 2-methyl-2-butene
- trans-2-butene

Answer: <https://biology-forums.com/index.php?topic=1897952>

### Question 455

How many asymmetric centers are present in the open chain form of the aldohexose D-(-)-gulose?

- 0
- 1
- 2
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1899845>

### Question 456

Predict the major product of the reaction shown below.

- 2,3-dimethyl-2-butene
- 3,3-dimethyl-1-butene
- 2,3-dimethyl-1-butene
- None of the above

Answer: <https://biology-forums.com/index.php?topic=1898010>

### Question 457

What is the approximate pKa of acetone?

- 45
- 20
- 13
- 10
- 4

Answer: <https://biology-forums.com/index.php?topic=1899163>

### Question 458

In a carbon atom, the 2s and 2p orbitals are the same energy.

- true
- false

Answer: <https://biology-forums.com/index.php?topic=1897101>

### Question 459

List the following five compounds, ethanamide, 1-propanol, methyl formate, acetic acid, and propanenitrile, in order of increasing boiling point. Start with the lowest boiling compound.

Answer: <https://biology-forums.com/index.php?topic=1898994>

### Question 460

Which of the following molecular formulas corresponds to a monocyclic saturated compound?

- C<sub>6</sub>H<sub>6</sub>
- C<sub>3</sub>H<sub>7</sub>Br
- C<sub>3</sub>H<sub>8</sub>O
- C<sub>3</sub>H<sub>7</sub>N

Answer: <https://biology-forums.com/index.php?topic=1897900>

### Question 461

Which of the following is a geminal dihalide?

- cis-1,2-dibromocyclopentane
- isobutyl chloride
- trans-1,4-diiodocyclohexane
- 1,3-dibromoheptane
- 3,3-dichloropentane

Answer: <https://biology-forums.com/index.php?topic=1897760>

### Question 462

If the absolute configuration at an asymmetric carbon does not change during the course of a reaction, the reaction is said to occur with \_\_\_\_\_ of stereochemistry.

Answer: <https://biology-forums.com/index.php?topic=1897829>

### Question 463

Draw the products formed in the Fischer esterification reaction between acetic acid (CH<sub>3</sub>CO<sub>2</sub>H) and cyclohexanol.

Answer: <https://biology-forums.com/index.php?topic=1898502>

### Question 464

Which of the following intermediates is thought to occur in the mechanism by which alkenes are hydrated in the presence of acid?

- free radical
- alkyne
- carbanion
- carbocation
- carbene

Answer: <https://biology-forums.com/index.php?topic=1898048>

### Question 465

Complete the following acid/base reaction and use pK<sub>a</sub> or pK<sub>b</sub> values to predict whether the equilibrium will favor the reactants or products:

Answer: <https://biology-forums.com/index.php?topic=1897217>

### Question 466

Consider how the I—Cl bond is polarized and predict the product which results when this mixed halogen adds to 1-methylcyclohexene.

Answer: <https://biology-forums.com/index.php?topic=1898092>

### Question 467

Explain why the synthetic route shown below would be unsuccessful.

H—CC:- Na+ H<sub>3</sub>CH<sub>2</sub>C—CC—CH<sub>2</sub>CH<sub>3</sub>  
3. CH<sub>3</sub>CH<sub>2</sub>I

Answer: <https://biology-forums.com/index.php?topic=1898220>

### Question 468

When t-butyl chloride undergoes solvolysis in a solvent mixture composed of 70% water/30% acetone, the reaction rate is slower than when the same compound is solvolyzed in 80% water/20% acetone. Explain.

Answer: <https://biology-forums.com/index.php?topic=1897827>

### Question 469

Consider the alcohol 3-methylpentan-3-ol. Is this alcohol primary, secondary, or tertiary?

Answer: <https://biology-forums.com/index.php?topic=1898302>

### Question 470

Maleic anhydride (below) undergoes addition polymerization. Draw the structure of the polymer that results.

Answer: <https://biology-forums.com/index.php?topic=1900266>

### Question 471

Butylated hydroxytoluene, or BHT, is a potent radical scavenger that is used as a food preservative. It reacts preferentially with free radicals in food to form a new, less reactive resonance stabilized species. The reaction of BHT with a damaging free radical is shown below. Draw two additional resonance structures for the radical form of BHT where the free electron is delocalized.

Answer: <https://biology-forums.com/index.php?topic=1897571>

### Question 472

A diastereomer is called erythro if its Fischer projection shows similar groups \_\_\_\_\_.

- on the same side of the molecule on adjacent carbons
- equally spaced about a central carbonyl
- directly above and below a central carbonyl
- on opposite sides of the molecule on adjacent carbons
- opposite each other on the same carbon

Answer: <https://biology-forums.com/index.php?topic=1899856>

### Question 473

Name the major alcohol product which results when 3,3-dimethylbut-1-ene is treated with dilute acid.

Answer: <https://biology-forums.com/index.php?topic=1898044>

### Question 474

What is the isoelectric point of lysine within in +/- 1 pH unit?

- 9
- 3
- 12
- 6

Answer: <https://biology-forums.com/index.php?topic=1900015>

### Question 475

Why do soaps work poorly in acidic water?

Answer: <https://biology-forums.com/index.php?topic=1900167>

### Question 476

In electrophilic aromatic substitution reactions, the -CF<sub>3</sub> group is \_\_\_\_\_.

- a deactivating group because it withdraws electron density through inductive destabilization
- an activating group because it donates electron density through resonance
- a deactivating group because it withdraws electron density through resonance
- an activating group because it donates electron density through inductive stabilization

Answer: <https://biology-forums.com/index.php?topic=1898577>

### Question 477

Draw the Fischer projection of (S)-2-hydroxybutanoic acid,  
Answer: <https://biology-forums.com/index.php?topic=1897692>

### Question 478

Draw a correct Lewis structure for CH<sub>3</sub>CHCHCOOH.  
Answer: <https://biology-forums.com/index.php?topic=1897206>

### Question 479

Complete the following reaction sequences below by filling-in the missing reagents or structures.  
Answer: <https://biology-forums.com/index.php?topic=1898271>

### Question 480

Provide the electron configuration of phosphorus.  
Answer: <https://biology-forums.com/index.php?topic=1897103>

### Question 481

Nitroglycerine is formed by the reaction of glycerine (propane-1,2,3-triol) and nitric acid. Provide the structure of nitroglycerine.  
Answer: <https://biology-forums.com/index.php?topic=1898508>

### Question 482

Why are the OH groups of carboxylic acids more acidic than alcohols?  
• inductive electron donating by the carbonyl oxygen  
• reduced hydrogen bonding capacity  
• because they have lower pK<sub>a</sub> values  
• resonance stabilization of the carboxylate ion  
• None of the above — carboxylic acids are not more acidic than alcohols.  
Answer: <https://biology-forums.com/index.php?topic=1898874>

### Question 483

Why do most fatty acids contain an even number of carbons?  
Answer: <https://biology-forums.com/index.php?topic=1900128>

### Question 484

Provide the structure of a soap. Label the hydrophilic and hydrophobic regions of the molecule you have drawn.  
Answer: <https://biology-forums.com/index.php?topic=1900162>

### Question 485

When D-(+)-xylose is treated with nitric acid, which of the following results?  
• a racemic mixture of aldaric acids  
• an optically active aldaric acid  
• an optically inactive aldaric acid  
• an optically active aldonic acid  
• an optically inactive aldonic acid  
Answer: <https://biology-forums.com/index.php?topic=1899900>

### Question 486

Which of the following amines could be formed by reduction of an amide?  
1) benzylamine 2) isopropylamine 3) aniline 4) triethylamine  
• 1 & 4  
• 2 & 3  
• 1  
• 1, 3, & 4  
• 3 & 4  
Answer: <https://biology-forums.com/index.php?topic=1898842>

### Question 487

When the carbonyl group of a neutral ketone is protonated \_\_\_\_\_.

- subsequent nucleophilic attack on the resulting species is said to occur under acid-catalyzed conditions
- the resulting species has a positive charge
- the resulting species is activated toward nucleophilic attack
- the resulting species becomes more electrophilic
- all of the above

Answer: <https://biology-forums.com/index.php?topic=1898677>

### Question 488

Which is more stable, cyclobutadiene or 1,3-butadiene? Explain.

Answer: <https://biology-forums.com/index.php?topic=1899729>

### Question 489

When a negatively charged species is most appropriately depicted as a hybrid of several resonance forms, the negative charge present is considered to be rapidly moving between the resonance forms bearing the formal negative charge.

- true
- false

Answer: <https://biology-forums.com/index.php?topic=1897114>

### Question 490

Provide the structure of atactic polystyrene.

Answer: <https://biology-forums.com/index.php?topic=1900261>

### Question 491

What class of organic product results when 1-heptyne is reacted with disiamylborane followed by treatment with basic hydrogen peroxide?

- diol
- ketone
- carboxylic acid
- aldehyde
- ether

Answer: <https://biology-forums.com/index.php?topic=1898261>

### Question 492

Which of the following alkyl halides reacts most rapidly via an SN1 solvolysis reaction in hot methanol?

- 1-fluorohexane
- 1-iodohexane
- 1-iodo-1-methylcyclohexane
- iodocyclohexane
- (R)-2-bromohexane

Answer: <https://biology-forums.com/index.php?topic=1897825>

### Question 493

Provide the sequence of reagents needed to convert  $\text{CH}_3\text{CH}_2\text{O}_2\text{CCH}_2\text{COCH}_3$  to 7-methyl-2-octanone.

Answer: <https://biology-forums.com/index.php?topic=1899175>

### Question 494

The strongest dichlorobutanoic acid is \_\_\_\_\_.

- 2,3-dichlorobutanoic acid
- 3,3-dichlorobutanoic acid
- 3,4-dichlorobutanoic acid
- 4,4-dichlorobutanoic acid
- 2,2-dichlorobutanoic acid

Answer: <https://biology-forums.com/index.php?topic=1898880>

### Question 495

Which set of reagents will best convert 2,2-dimethylpropan-1-ol (neopentyl alcohol) to 4,4-dimethylpentan-2-ol?

- 1. HCl

2. Mg  
3. CH<sub>3</sub>CHO  
4. H<sub>3</sub>O<sup>+</sup>  
• 1. HCl, ZnCl<sub>2</sub>  
2. Mg  
3. CH<sub>2</sub>O  
4. H<sub>3</sub>O<sup>+</sup>  
• 1. HCl, ZnCl<sub>2</sub>  
2. Mg  
3. CH<sub>3</sub>CHO  
4. H<sub>3</sub>O<sup>+</sup>  
• 1. SOCl<sub>2</sub>  
2. Mg  
3. CH<sub>3</sub>CHO  
4. H<sub>3</sub>O<sup>+</sup>

Answer: <https://biology-forums.com/index.php?topic=1898483>

### Question 496

What is the relative reactivity of 2° vs 1° hydrogens in the free radical bromination of n-butane if the ratio of 1-bromobutane to 2-bromobutane formed is 7:93?

Answer: <https://biology-forums.com/index.php?topic=1897581>

### Question 497

Natural rubber is a \_\_\_\_\_.

- polyamide
- polycarbonate
- polyester
- polyurethane
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900273>

### Question 498

Draw the tosylate ion and explain why it is a particularly good leaving group.

Answer: <https://biology-forums.com/index.php?topic=1898455>

### Question 499

In which unit is frequency measured?

- joule
- Kcal
- gauss
- hertz

Answer: <https://biology-forums.com/index.php?topic=1899209>

### Question 500

Sodium borohydride can be used to reduce cyclohexanone to cyclohexanol. How could one use IR to determine if all starting material had been consumed?

Answer: <https://biology-forums.com/index.php?topic=1899277>

### Question 501

Named for a pair of Nobel Prize winners, \_\_\_\_\_ catalysts, which are composed of aluminum- and titanium-containing Lewis acids, provide a high measure of stereocontrol in alkene polymerizations.

Answer: <https://biology-forums.com/index.php?topic=1900272>

### Question 502

Provide the structure of the open-chain form of D-galactose.

Answer: <https://biology-forums.com/index.php?topic=1899852>

### Question 503

Which is more nucleophilic, t-butoxide or ethoxide? Explain.



Answer: <https://biology-forums.com/index.php?topic=1897794>

### Question 504

Draw 3 significant resonance structures for the compound shown below. Place a box around the major contributor. Fill in any missing formal charges.

Answer: <https://biology-forums.com/index.php?topic=1897188>

### Question 505

Based on the structure below, what is the value for the H-N-CH<sub>3</sub> bond angle?

- 90 degrees
- 60 degrees
- 109 degrees
- 120 degrees

Answer: <https://biology-forums.com/index.php?topic=1897242>

### Question 506

What is the pK<sub>a</sub> and general acid strength of formic acid if its conjugate base form has a pK<sub>b</sub> of 10.23?

- 3.77 - fairly strong weak acid
- 14.00 - not an acid but rather a strong base
- 5.99 - moderately strong weak acid
- 3.23 - fairly strong weak acid
- cannot be determined from the information given

Answer: <https://biology-forums.com/index.php?topic=1897127>

### Question 507

Describe a sequence of reactions by which meso-2,3-dibromobutane can be straightforwardly prepared from propyne.

Answer: <https://biology-forums.com/index.php?topic=1898278>

### Question 508

Within a given row of the periodic table, electronegativity typically increases left to right across the row.

- true
- false

Answer: <https://biology-forums.com/index.php?topic=1897106>

### Question 509

List the following bromides in order of their increasing reactivity as substrates in S<sub>N</sub>1 reactions: 1-iodo-1-ethylcyclopentane, chlorocyclopentane, and iodocyclopentane.

Answer: <https://biology-forums.com/index.php?topic=1897822>

### Question 510

Choose the functional group which is not represented in the structure of Lipitor (TM).

- carboxylic acid
- amide
- nitrile
- aromatic hydrocarbon
- None of the above

Answer: <https://biology-forums.com/index.php?topic=1897312>

### Question 511

Orbitals which are equal in energy are referred to as \_\_\_\_\_.

- degenerate
- polar
- nonpolar
- filled
- nodes

Answer: <https://biology-forums.com/index.php?topic=1897100>

### Question 512

Provide the structure of the major organic product that results when 1-octanol is treated with pyridinium chlorochromate.

Answer: <https://biology-forums.com/index.php?topic=1898434>

### Question 513

Predict the major organic product in the reaction shown below.

ethyl magnesium chloride + pent-1-yne

Answer: <https://biology-forums.com/index.php?topic=1898387>

### Question 514

The term \_\_\_\_\_ is sometimes used to describe peptides which contain four to ten amino acid residues.

Answer: <https://biology-forums.com/index.php?topic=1900051>

### Question 515

The nitration of anisole \_\_\_\_\_.

- proceeds more rapidly than the nitration of benzene and yields predominantly the ortho, para products
- proceeds more slowly than the nitration of benzene and yields predominantly the ortho, para products
- proceeds more rapidly than the nitration of benzene and yields predominantly the meta product
- proceeds at the same rate as the nitration of benzene and yields predominantly the meta product
- proceeds more slowly than the nitration of benzene and yields predominantly the meta product

Answer: <https://biology-forums.com/index.php?topic=1898547>

### Question 516

Explain which structural features of phospholipids make them suitable components from which to form a lipid bilayer.

Answer: <https://biology-forums.com/index.php?topic=1900172>

### Question 517

The mechanism for the acid-catalyzed hydration of alkenes is simply the reverse of the mechanism by which alcohols are dehydrated using concentrated acid. This is an illustration of the principle of \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1898042>

### Question 518

How many elements of unsaturation are implied by the molecular formula

- 0
- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1897907>

### Question 519

How many moles of water are produced when one mole of propyne undergoes complete combustion?

- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1898212>

### Question 520

In addition to the use of complex metal hydrides, what other reaction can be used to reduce aldehydes and ketones to alcohols?

Answer: <https://biology-forums.com/index.php?topic=1898404>

### Question 521

Modify the phosphatidic acid below so that it becomes a lecithin.

Answer: <https://biology-forums.com/index.php?topic=1900179>

### Question 522

The presence of which element is indicated by a peak at  $m/z$  127 and a characteristic 127-unit gap in the mass spectrum?

- I
- Br
- S
- Cl
- N

Answer: <https://biology-forums.com/index.php?topic=1899293>

### Question 523

\_\_\_\_\_ are added to polymers to make them more flexible.

Answer: <https://biology-forums.com/index.php?topic=1900325>

### Question 524

Why is a terminal alkyne favored when sodium amide (NaNH<sub>2</sub>) is used in an elimination reaction with 2,3-dichlorohexane?

- The positions of the Cl atoms induce the net formation of the terminal alkyne.
- The strong base deprotonates the terminal alkyne and removes it from the equilibrium.
- The terminal alkyne is not favored in this reaction.
- The terminal alkyne is more stable than the internal alkyne and is naturally the favored product.
- The resonance favors the formation of the terminal rather than internal alkyne.

Answer: <https://biology-forums.com/index.php?topic=1898243>

### Question 525

Most monosaccharides are highly water soluble. Offer an explanation.

Answer: <https://biology-forums.com/index.php?topic=1899838>

### Question 526

What group of lipids are esters of long-chain fatty acids and long-chain alcohols?

Answer: <https://biology-forums.com/index.php?topic=1900094>

### Question 527

Which would be more appropriate as the reduction in the following sequence, a Clemmensen or a Wolff-Kishner? Explain.

Answer: <https://biology-forums.com/index.php?topic=1898721>

### Question 528

Provide the structure of the predominant form of L-leucine present in an aqueous solution at pH 2.

Answer: <https://biology-forums.com/index.php?topic=1900005>

### Question 529

Which of the following is also an acceptable name for 3-nitrophenol?

- o-nitrophenol
- p-nitrophenol
- m-nitrophenol
- 3-cresol
- hydroquinone

Answer: <https://biology-forums.com/index.php?topic=1899795>

### Question 530

The hybridization of the nitrogen in the molecule shown below is sp<sup>2</sup>. Briefly explain why.

Answer: <https://biology-forums.com/index.php?topic=1897251>

### Question 531

Provide the structure of the product which results when D-ribose is treated with bromine water.

Answer: <https://biology-forums.com/index.php?topic=1899904>

### Question 532

Draw the structure of 3-pentanamine.

Answer: <https://biology-forums.com/index.php?topic=1898735>

### Question 533

Mark all the sequences of reactions that convert a carboxylic acid to an aldehyde.  
(More than one answer is possible.)

- 1)  $\text{SOCl}_2$  2)  $\text{LiAl}(\text{O}-\text{t-Bu})_3\text{H}$
- 1)  $\text{NaBH}_4$  2)  $\text{H}_3\text{O}^+$  3) PCC
- 1)  $\text{LiAlH}_4$  2)  $\text{Ag}(\text{NH}_3)_2\text{OH}$
- 1)  $\text{CH}_2\text{N}_2$  2) DIBAL 3)  $\text{H}_3\text{O}^+$

Answer: <https://biology-forums.com/index.php?topic=1898947>

### Question 534

Name the product which results when ethyl butanoate is treated with sodium ethoxide followed by neutralization.

Answer: <https://biology-forums.com/index.php?topic=1899151>

### Question 535

When 2-methylcyclohexanone is treated with catalytic base in excess  $\text{D}_2\text{O}$ , how many deuterium atoms become incorporated in the organic compound?

- 0
- 1
- 2
- 3
- 5

Answer: <https://biology-forums.com/index.php?topic=1899090>

### Question 536

Dopamine is shown below. What functional group, or structural element is not present in this compound?

- methylene
- carboxyl
- amino
- aromatic ring
- hydroxyl

Answer: <https://biology-forums.com/index.php?topic=1897323>

### Question 537

Explain why the synthetic route shown below would be unsuccessful.

Answer: <https://biology-forums.com/index.php?topic=1898344>

### Question 538

What is a micelle?

Answer: <https://biology-forums.com/index.php?topic=1900164>

### Question 539

What is the approximate  $\text{pK}_a$  of alcohols, ROH?

Answer: <https://biology-forums.com/index.php?topic=1898334>

### Question 540

Provide a structure for the major substitution and elimination product of the following reaction.

Answer: <https://biology-forums.com/index.php?topic=1897864>

### Question 541

What is synthesis gas and what commercially important alcohol is prepared from it?

Answer: <https://biology-forums.com/index.php?topic=1898331>

### Question 542

Which of the following molecules would be expected to have its  $\text{C}=\text{C}$  stretching frequency at the highest wavenumber: benzene, 1,3-pentadiene, or 1-pentene?

Answer: <https://biology-forums.com/index.php?topic=1899238>

### Question 543

The Tg of a polymer is its \_\_\_\_\_.

- growth temperature
- lattice relaxation time
- Gaussian thermocouple
- glass transition temperature
- gum transition temperature

Answer: <https://biology-forums.com/index.php?topic=1900324>

### Question 544

Do all primary alkyl iodides undergo SN2 reactions with sodium cyanide in DMSO at identical rates? Explain.

Answer: <https://biology-forums.com/index.php?topic=1897805>

### Question 545

Circle all atoms that are coplanar in the molecule below.

Answer: <https://biology-forums.com/index.php?topic=1897890>

### Question 546

Beginning with sodium acetylide (NaCCH), propose a three-step synthesis of hexanal.

Answer: <https://biology-forums.com/index.php?topic=1898669>

### Question 547

Which molecule below is an ether?

- (CH<sub>3</sub>)<sub>2</sub>C=CH<sub>2</sub>
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H
- CH<sub>3</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>3</sub>
- (CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>NH<sub>2</sub>
- (CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>OH

Answer: <https://biology-forums.com/index.php?topic=1897324>

### Question 548

The pi bond of an alkyne is \_\_\_\_\_ and \_\_\_\_\_ than the pi bond of an alkene.

- shorter; stronger
- shorter; weaker
- longer; weaker
- longer; stronger

Answer: <https://biology-forums.com/index.php?topic=1898209>

### Question 549

Why would you use acetic anhydride to do the following reaction as opposed to acetyl chloride?

Answer: <https://biology-forums.com/index.php?topic=1899053>

### Question 550

Draw the most stable conformation of cis-1-ethyl-3-methylcyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897461>

### Question 551

What two features are prominent in the infrared spectrum of a carboxylic acid?

Answer: <https://biology-forums.com/index.php?topic=1898896>

### Question 552

Using a 60 MHz spectrometer, the protons in dichloromethane appear at 5.30 ppm. When the same sample is placed in a 100 MHz instrument, where does the signal appear?

- 3.18

- 8.33
- 5.30
- cannot be determined from information given

Answer: <https://biology-forums.com/index.php?topic=1899322>

### Question 553

Show the reagents necessary to perform the synthesis shown below.

Answer: <https://biology-forums.com/index.php?topic=1899549>

### Question 554

An aglycone is a group bound to \_\_\_\_\_.

- the oxygen of C6 in a glycoside
- a purine base
- a pyrimidine base
- a xanthate
- the anomeric carbon in a glycoside

Answer: <https://biology-forums.com/index.php?topic=1899912>

### Question 555

Are triglycerides simple lipids? Explain.

Answer: <https://biology-forums.com/index.php?topic=1900093>

### Question 556

Complete the following SN<sub>2</sub> reaction by providing structures for the necessary starting materials.

Answer: <https://biology-forums.com/index.php?topic=1897811>

### Question 557

Show how the carbon p orbitals overlap to form the LUMO of the allyl anion.

Answer: <https://biology-forums.com/index.php?topic=1899634>

### Question 558

Write a Lewis structure for a compound with the molecular formula H<sub>2</sub>N<sub>2</sub>.

Answer: <https://biology-forums.com/index.php?topic=1897169>

### Question 559

Which has a lower characteristic stretching frequency, the C—H or C—D bond? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1899223>

### Question 560

Which of the following difluorocyclohexane isomers has the greatest molecular dipole in its least stable chair conformation?

- trans 1,3-difluorocyclohexane
- cis 1,2-difluorocyclohexane
- cis 1,3-difluorocyclohexane
- trans 1,2-difluorocyclohexane

Answer: <https://biology-forums.com/index.php?topic=1897463>

### Question 561

Which of the alkyl chlorides listed below undergoes dehydrohalogenation in the presence of a strong base to give pent-2-ene as the only alkene product?

- 1-chloro-3-methylbutane
- 2-chloropentane
- 1-chloro-2-methylbutane
- 3-chloropentane
- 1-chloropentane

Answer: <https://biology-forums.com/index.php?topic=1897970>

### Question 562

Circle the most stable alkene in the set of isomers below.

Answer: <https://biology-forums.com/index.php?topic=1897962>

### Question 563

Why doesn't a salt like KCl dissolve in hexane ( $\text{CH}_3(\text{CH}_2)_4\text{CH}_3$ ), a non-polar solvent?

Answer: <https://biology-forums.com/index.php?topic=1897334>

### Question 564

Provide the structure of the major organic product which results when 2-bromo-2-methylbutane is treated with sodium ethoxide.

Answer: <https://biology-forums.com/index.php?topic=1897858>

### Question 565

Provide the structure of the aldol product that results when 5-methylhexanal is treated with hydroxide.

Answer: <https://biology-forums.com/index.php?topic=1899130>

### Question 566

Name the compound which results when pent-1-yne is treated with sodium in liquid ammonia.

Answer: <https://biology-forums.com/index.php?topic=1898263>

### Question 567

Provide the structure of poly(isobutylene).

Answer: <https://biology-forums.com/index.php?topic=1900227>

### Question 568

Which diene reacts more rapidly in Diels-Alder reactions, cyclopentadiene or 1,3-butadiene? Briefly explain your choice.

Answer: <https://biology-forums.com/index.php?topic=1899667>

### Question 569

Describe a sequence of reactions by which  $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_2\text{CH}_3$  can be straightforwardly prepared from but-1-yne.

Answer: <https://biology-forums.com/index.php?topic=1898288>

### Question 570

In the compound sodium methoxide ( $\text{NaOCH}_3$ ), there is \_\_\_\_\_ bonding.

- resonance stabilized
- ionic
- a mixture of ionic and covalent
- nonpolar covalent
- polar covalent

Answer: <https://biology-forums.com/index.php?topic=1897112>

### Question 571

One of the products that results when 3-bromopentane is heated in methanol is pent-2-ene. Draw the reaction and provide a mechanism.

Answer: <https://biology-forums.com/index.php?topic=1897996>

### Question 572

A nonlinear molecule with n atoms generally has \_\_\_\_\_ fundamental vibrational modes.

- $3n - 6$
- $2n - 2$
- $2n$
- $3n - 3$
- $3n$

Answer: <https://biology-forums.com/index.php?topic=1899222>

### Question 573

Absorption of UV-visible energy by a molecule results in \_\_\_\_\_.

- rotational transitions
- vibrational transitions
- nuclear transitions
- electronic transitions
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899694>

### Question 574

Rank the following bonds in order of increasing stretching frequency (cm<sup>-1</sup>) in IR spectroscopy:

Answer: <https://biology-forums.com/index.php?topic=1899265>

### Question 575

The structure of uracil is shown below. What is the molecular shape of the nitrogens?

Answer: <https://biology-forums.com/index.php?topic=1897255>

### Question 576

All chiral D-sugars rotate plane-polarized light \_\_\_\_\_.

- counterclockwise
- clockwise
- since they are optically inactive
- in a direction that cannot be predicted but must be determined experimentally
- +20.0°

Answer: <https://biology-forums.com/index.php?topic=1899842>

### Question 577

Explain why alkoxides act as leaving groups in nucleophilic acyl substitutions but not in SN2 reactions.

Answer: <https://biology-forums.com/index.php?topic=1899011>

### Question 578

Shown below is one of the sex pheromones from the butterfly family. How many sp<sup>3</sup> hybridized carbon atoms are present?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1897248>

### Question 579

Provide a detailed, stepwise mechanism for the acid-catalyzed enolization of acetaldehyde.

Answer: <https://biology-forums.com/index.php?topic=1899085>

### Question 580

Biodiesel is formed by \_\_\_\_\_.

- saponification of a triglyceride
- hydrolysis of a wax
- esterification of a triglyceride
- saponification of a prostaglandin

Answer: <https://biology-forums.com/index.php?topic=1900103>

### Question 581

Which of the following describes the compound below?

- fused bicyclic
- bridged bicyclic
- spiro bicyclic
- bridged tricyclic

Answer: <https://biology-forums.com/index.php?topic=1897468>



### Question 582

Which of the following alcohols will give a positive chromic acid test?

- tert-butanol
- cyclohexanol
- pentan-3-ol
- both A and B
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1898423>

### Question 583

Which of the following correctly describes the structural relationship between D-glucose and L-glucose?

- diastereomers but not epimers
- not isomers
- enantiomers
- constitutional isomers
- diastereomers and epimers

Answer: <https://biology-forums.com/index.php?topic=1899863>

### Question 584

The protons labeled Ha in the structure below generally show up as a triplet, even though there are three neighboring protons. The coupling constant is approximately 7 Hz. What does this suggest about the size of the coupling constant for the aldehydic proton?

Answer: <https://biology-forums.com/index.php?topic=1899345>

### Question 585

Name the alkane shown.



Answer: <https://biology-forums.com/index.php?topic=1897376>

### Question 586

Consider the four substituents below. Order them in decreasing priority according to the Cahn-Ingold-Prelog priority system. (Highest priority is first, lowest is last.)

-D, -H, -CH<sub>3</sub>, -CH<sub>2</sub>CH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1897635>

### Question 587

An enolate attacks an aldehyde and the resulting product is subsequently protonated. What type of reaction is this?

- a Fischer esterification
- a Selmán-Jones reaction
- a base-mediated aldol condensation
- an acid-catalyzed aldol condensation
- a Hell-Volhard-Zelinsky reaction

Answer: <https://biology-forums.com/index.php?topic=1899126>

### Question 588

A nitrile can be made by dehydrating an amide. However, for this reaction to occur, the amide must be \_\_\_\_\_.

- primary
- secondary
- N-methylated
- tertiary
- part of a lactam

Answer: <https://biology-forums.com/index.php?topic=1899063>

### Question 589

Remove an H<sup>+</sup> from the following structure to create the most reactive (least stable) carbanion.

Answer: <https://biology-forums.com/index.php?topic=1897603>

### Question 590

Using the scale below, draw the  $^1\text{H}$  NMR spectrum for isobutyl acetate, shown below. Present the peaks with correct splitting patterns and at the approximate chemical shift ( $\pm 0.5$  ppm). Just above each peak, indicate the relative integration value of each type of hydrogen.

Answer: <https://biology-forums.com/index.php?topic=1899465>

### Question 591

Stereoisomeric aldohexoses that differ in configuration at only a single carbon are \_\_\_\_\_.

- enantiomers
- epimers
- meso compounds
- threo sugars
- constitutional isomers

Answer: <https://biology-forums.com/index.php?topic=1899858>

### Question 592

Provide the reagents necessary for carrying out the transformation of 2-methylheptane to 2-methylhept-2-ene.

Answer: <https://biology-forums.com/index.php?topic=1898004>

### Question 593

Provide a structure of the tripeptide VKE.

Answer: <https://biology-forums.com/index.php?topic=1900047>

### Question 594

Calculate the e.e. of a mixture containing 8.0 g of (-)-glyceraldehyde and 2.0 g of (+)-glyceraldehyde.

Answer: <https://biology-forums.com/index.php?topic=1897683>

### Question 595

Provide the structure of propanoic anhydride.

Answer: <https://biology-forums.com/index.php?topic=1898965>

### Question 596

Provide a representation of isotactic poly(acrylonitrile).

Answer: <https://biology-forums.com/index.php?topic=1900268>

### Question 597

Within the context of commercial uses of alkanes, explain what "knocking" is.

Answer: <https://biology-forums.com/index.php?topic=1897395>

### Question 598

What term describes the structural relationship between (2R,3R,4S)-2,3,4-trichloroheptane and (2S,3S,5R)-2,3,5-trichloroheptane?

- constitutional isomers
- diastereomers
- conformers
- not isomers
- enantiomers

Answer: <https://biology-forums.com/index.php?topic=1897607>

### Question 599

The following compound was isolated from the liverwort *Porella chilensis* and has shown to be effective in inhibiting the human pathogen *Pseudomonas aeruginosa*. Show that this structure belongs to the terpene family by dividing the molecule up into each isoprene unit and then give the terpene classification.

Answer: <https://biology-forums.com/index.php?topic=1900208>

### Question 600

If triolein was transesterified with methanol under basic conditions to form biodiesel, draw the products of this reaction.

Answer: <https://biology-forums.com/index.php?topic=1900114>

### Question 601

Which of the following is the most reactive carboxylic acid derivative?

- nitrile
- ester
- acid chloride
- anhydride
- amide

Answer: <https://biology-forums.com/index.php?topic=1899002>

### Question 602

L-Ribulose may be classified as \_\_\_\_\_.

- an aldopentose
- an aldotetrose
- a ketotetrose
- an aldohexose
- a ketopentose

Answer: <https://biology-forums.com/index.php?topic=1899846>

### Question 603

Provide a structure for (Z)-4-bromo-3-heptene.

Answer: <https://biology-forums.com/index.php?topic=1897931>

### Question 604

What two molecules were condensed in an aldol reaction to produce

Answer: <https://biology-forums.com/index.php?topic=1899140>

### Question 605

Which of the following is also an acceptable name for 1,3,5-trimethylbenzene?

- styrene
- cymene
- cumene
- mesitylene
- 1,3,5-xylene

Answer: <https://biology-forums.com/index.php?topic=1899799>

### Question 606

Provide the IUPAC name of  $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{C}(\text{CH}_3)_3$ .

Answer: <https://biology-forums.com/index.php?topic=1897365>

### Question 607

Provide the sequence of reagents needed to convert  $(\text{CH}_3\text{CH}_2\text{O}_2\text{C})_2\text{CH}_2$  to heptanoic acid.

Answer: <https://biology-forums.com/index.php?topic=1899167>

### Question 608

Draw the four major resonance structures of the intermediate which results when o-nitrochlorobenzene

is treated with NaOH.

Answer: <https://biology-forums.com/index.php?topic=1898607>

### Question 609

Provide the structure of the major organic product which results when (S)-2-iodopentane is treated with KCN in DMF.

Answer: <https://biology-forums.com/index.php?topic=1897815>

### Question 610

Humulene is a monocyclic terpene constituent of carnations. When 0.25 mol of humulene is hydrogenated in the presence of platinum catalyst, 0.75 mol of  $\text{H}_2$  reacts with the humulene to produce a monocyclic hydrocarbon of formula  $\text{C}_{15}\text{H}_{30}$ . What is the molecular formula of humulene?

Answer: <https://biology-forums.com/index.php?topic=1898101>

### Question 611

Compute the empirical and molecular formulas for the compound of molecular weight 180 g/mol which is shown to contain 40.0% C and 6.7% H by elemental analysis.

Answer: <https://biology-forums.com/index.php?topic=1897117>

### Question 612

What two atomic orbitals or hybrid atomic orbitals overlap to form the C—H bond in ethylene?

- C p + H s
- C sp<sup>2</sup> + H s
- C sp<sup>3</sup> + H s
- C sp + H s

Answer: <https://biology-forums.com/index.php?topic=1897893>

### Question 613

Assign the proper configurational label, R or S, to each chiral carbon in the molecule below.

Answer: <https://biology-forums.com/index.php?topic=1897654>

### Question 614

In the hydrocarbon shown below, how many tertiary hydrogens are present?

- 0
- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1897556>

### Question 615

Provide the reagents necessary to accomplish the following transformation.

methyl benzoate (PhCO<sub>2</sub>CH<sub>3</sub>) to benzyl alcohol (PhCH<sub>2</sub>OH)

Answer: <https://biology-forums.com/index.php?topic=1898400>

### Question 616

Which of the following fragments would not result when the decapeptide Asn-Gly-Lys-Phe-Pro-Arg-Gly-Leu-Lys-Ser is treated with trypsin?

- Phe-Pro-Arg
- Pro-Arg-Gly-Leu
- Asn-Gly-Lys
- Gly-Leu-Lys

Answer: <https://biology-forums.com/index.php?topic=1900064>

### Question 617

Which of the following is the strongest activating group in electrophilic aromatic substitution reactions?

- -CH<sub>2</sub>CH<sub>3</sub>
- -NO<sub>2</sub>
- -N(CH<sub>3</sub>)<sub>2</sub>
- -OCH<sub>3</sub>
- -CO<sub>2</sub>CH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1898539>

### Question 618

Show the reagents necessary to prepare 2-phenylethanol from bromobenzene.

Answer: <https://biology-forums.com/index.php?topic=1899570>

### Question 619

When a plasticizer is added to a polymer, the overall effect is to \_\_\_\_\_ the crystallinity of the polymer and \_\_\_\_\_ its T<sub>g</sub>.

- eliminate; raise
- increase; raise
- reduce; raise

- reduce; lower
- increase; lower

Answer: <https://biology-forums.com/index.php?topic=1900332>

### Question 620

Draw the structure of N-ethyl-N-methyl-1-hexanamine.

Answer: <https://biology-forums.com/index.php?topic=1898739>

### Question 621

The nonprotein part of a conjugated protein is called a \_\_\_\_\_ group.

Answer: <https://biology-forums.com/index.php?topic=1900038>

### Question 622

What name is given to the type of "control" which arises in a reaction which does not achieve equilibrium and in which the product distribution is determined by the relative activation energies of the pathways which produced them?

Answer: <https://biology-forums.com/index.php?topic=1899622>

### Question 623

Distillation of mixtures of ethanol and water cannot increase the ethanol content of the mixture above 95% because this solution boils at a lower temperature than either pure ethanol or pure water. The term which describes this lower boiling mixture is \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1898326>

### Question 624

Provide the structure of trans-1,3-cyclohexanedicarboxylic acid.

Answer: <https://biology-forums.com/index.php?topic=1898860>

### Question 625

Propose a synthesis of 2-phenylethylamine from toluene and any other necessary reagents.

Answer: <https://biology-forums.com/index.php?topic=1899068>

### Question 626

How many standard amino acids are there?

- 20
- 12
- 4
- 30
- 64

Answer: <https://biology-forums.com/index.php?topic=1899963>

### Question 627

Poly(lactic acid) is a biodegradable polymer that is used in 3D printing. It can be made through the polymerization of L-lactic acid (below). Will the polymer be a step-growth or chain-growth polymer?

Answer: <https://biology-forums.com/index.php?topic=1900318>

### Question 628

Provide the structure of L-arginine at pH 2.0.

Answer: <https://biology-forums.com/index.php?topic=1899990>

### Question 629

Arrange the following compounds in order of increasing boiling point:

CH<sub>3</sub>NHCH<sub>2</sub>CH<sub>3</sub>, CH<sub>3</sub>OCH<sub>2</sub>CH<sub>3</sub>, (CH<sub>3</sub>)<sub>3</sub>N, and CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH.

Answer: <https://biology-forums.com/index.php?topic=1898767>

### Question 630

The oxidation of a secondary alcohol with NaOCl in acetic acid proceeds through the reaction of the alcohol with the reactive intermediate ClOH<sub>2</sub><sup>+</sup>. Write a mechanism that shows how isopropyl alcohol is oxidized to acetone (CH<sub>3</sub>COCH<sub>3</sub>) using ClOH<sub>2</sub><sup>+</sup> in acetic acid (CH<sub>3</sub>COOH).

Answer: <https://biology-forums.com/index.php?topic=1898432>

### Question 631

Provide the structure of the hydrate of cyclopentanone.

Answer: <https://biology-forums.com/index.php?topic=1898679>

### Question 632

Draw the structure of the enantiomer of (2S, 3R)-2,3-dichloropentane. Take particular care to indicate three-dimensional stereochemical detail properly.

Answer: <https://biology-forums.com/index.php?topic=1897658>

### Question 633

Show how the Gabriel synthesis could be used to make S-3-methyloctan-1-amine.

Answer: <https://biology-forums.com/index.php?topic=1898853>

### Question 634

Draw an acceptable structure for 1-ethyl-2-(2,2-dimethylpentyl)cyclopentane.

Answer: <https://biology-forums.com/index.php?topic=1897385>

### Question 635

The energy of a photon is \_\_\_\_\_ proportional to its wavelength.

Answer: <https://biology-forums.com/index.php?topic=1899193>

### Question 636

Which of the cations below would be subject to a structural rearrangement?

- 1, 2, & 3
- 3
- 2 & 3
- 1

Answer: <https://biology-forums.com/index.php?topic=1897835>

### Question 637

The formal charge on the oxygens in the compound below are \_\_\_\_\_.

- Oxygen 1: -1, Oxygen 2: 0
- Oxygen 1: 0, Oxygen 2: 0
- Oxygen 1: +1, Oxygen 2: 0
- Oxygen 1: -1, Oxygen 2: -1
- Oxygen 1: 0, Oxygen 2: -1

Answer: <https://biology-forums.com/index.php?topic=1897170>

### Question 638

An ylide is a molecule that can be described as a \_\_\_\_\_.

- carbocation bound to a carbon radical
- carbanion bound to a negatively charged heteroatom
- carbocation bound to a diazonium ion
- carbocation bound to a positively charged heteroatom
- carbanion bound to a positively charged heteroatom

Answer: <https://biology-forums.com/index.php?topic=1898689>

### Question 639

The stereochemical configuration of D-Threonine is (2R, 3S). Which of the following structures corresponds to the correct configuration?

- I
- II
- III
- IV

Answer: <https://biology-forums.com/index.php?topic=1897736>

### Question 640

Which of the following alkyl chlorides will undergo SN2 reaction most readily?

- 3-chloro-2-methylpentane
- 2-chloro-4-methylpentane
- 1-chloro-4-methylpentane
- 2-chloro-2-methylpentane
- 2-chloro-3-methylpentane

Answer: <https://biology-forums.com/index.php?topic=1897800>

### Question 641

Describe a sequence of reactions by which the compound shown below can be straightforwardly prepared from acetylene.

[html]Describe a sequence of reactions by which the compound shown below can be straightforwardly prepared from acetylene.

[/html]

Answer: <https://biology-forums.com/index.php?topic=1898237>

### Question 642

Acids can be converted to primary amines by \_\_\_\_\_.

- conversion to the nitrile followed by treatment with LiAlH<sub>4</sub>
- conversion to the diazonium salt followed by treatment with NaBH<sub>4</sub>
- conversion to the primary amide followed by treatment with LiAlH<sub>4</sub>
- both A and B
- both A and C

Answer: <https://biology-forums.com/index.php?topic=1899034>

### Question 643

Show how the reaction of an allylic halide with a Grignard reagent might be used to synthesize the following:

Answer: <https://biology-forums.com/index.php?topic=1899644>

### Question 644

Which compound has a strong and broad IR absorption centered at 3400 cm<sup>-1</sup>?

- 1-butanol
- diethyl ether
- 2-hexyne
- octane
- benzene

Answer: <https://biology-forums.com/index.php?topic=1899243>

### Question 645

Draw an acceptable structure for 3-sec-butylhept-1-yne.

Answer: <https://biology-forums.com/index.php?topic=1898155>

### Question 646

The relationship between ketones and their corresponding enols is one of \_\_\_\_\_.

- cis-trans isomers
- allotropes
- enantiomers
- diastereomers
- tautomers

Answer: <https://biology-forums.com/index.php?topic=1899081>

### Question 647

Describe the sources of angle strain and torsional strain present in cyclopropane.

Answer: <https://biology-forums.com/index.php?topic=1897440>

### Question 648

Which type of polymer is not typically formed via step-growth polymerization?

- polycarbonate
- polyethylene
- polyester

- polyamide
- polyurethane

Answer: <https://biology-forums.com/index.php?topic=1900293>

### Question 649

How many distinct p orbitals exist in the second electron shell, where  $n = 2$ ?

- 2
- 3
- 4
- 5
- 6

Answer: <https://biology-forums.com/index.php?topic=1897092>

### Question 650

Provide the structure of 4-oxohexanoic acid.

Answer: <https://biology-forums.com/index.php?topic=1898628>

### Question 651

Draw an acceptable structure for 4-ethyl-6-(1,2-dimethylpropyl)decane.

Answer: <https://biology-forums.com/index.php?topic=1897384>

### Question 652

The mass spectrum of which compound has an  $M+2$  peak that has intensity that is about 25% of its  $M+$  peak?

- 3-pentanol
- pentane
- 3-iodopentane
- 3-chloropentane
- 3-bromopentane

Answer: <https://biology-forums.com/index.php?topic=1899297>

### Question 653

In the addition of HBr to conjugated dienes, is the product which results from 1,2-addition or that which results from 1,4-addition typically the product of kinetic control?

Answer: <https://biology-forums.com/index.php?topic=1899621>

### Question 654

The sodium or potassium salt of a fatty acid is known as a \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1900152>

### Question 655

Provide the structure of 3-oxobutanenitrile.

Answer: <https://biology-forums.com/index.php?topic=1898982>

### Question 656

Which of the following molecules contains a polar covalent bond?

- H<sub>2</sub>
- He
- NaCl
- CH<sub>3</sub>Cl
- F<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1897107>

### Question 657

A compound (C<sub>5</sub>H<sub>8</sub>O) shows IR absorptions at 3600 and 3300 cm<sup>-1</sup>. Its <sup>1</sup>H NMR spectrum contained singlets at \_\_\_\_\_ and 2.9 (broad) (ppm) in a ratio of 6:1:1. Name this compound.

Answer: <https://biology-forums.com/index.php?topic=1899334>

### Question 658



In electrophilic aromatic substitution reactions the nitro group is \_\_\_\_\_.

- an o,p-director since it stabilizes the ortho, para sigma complex more than the meta
- an o,p-director since it stabilizes the ortho, para sigma complex less than the meta
- a m-director since it destabilizes the meta sigma complex more than the ortho, para
- a m-director since it destabilizes the meta sigma complex less than the ortho, para
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898554>

### Question 659

What name is given to a protein infectious agent that is thought to promote misfolding and polymerization of normal protein molecules and that is believed to cause Creutzfeldt-Jakob Disease?

Answer: <https://biology-forums.com/index.php?topic=1900085>

### Question 660

Which of the following could result from the dehydration of a self-aldol condensation product?

- 3-methyl-4-penten-2-one
- 4-methyl-5-hexen-2-one
- 4-methyl-3-penten-2-one
- 4-methyl-4-hexen-2-one
- 4-methyl-4-penten-2-one

Answer: <https://biology-forums.com/index.php?topic=1899132>

### Question 661

(S)-2-Methylbutanal \_\_\_\_\_ upon sitting in an acidic or a basic aqueous solution.

- irreversibly forms the hydrate
- inverts completely to the R configuration
- racemizes
- esterifies
- hydrolyzes

Answer: <https://biology-forums.com/index.php?topic=1899098>

### Question 662

Which of the following compound has the highest melting point?

- m-dichlorobenzene
- toluene
- o-dichlorobenzene
- p-dichlorobenzene
- benzene

Answer: <https://biology-forums.com/index.php?topic=1899821>

### Question 663

Draw the two fatty acid structures that result from acid and base hydrolysis of a triacylglyceride and explain how they differ. (Use a core structure of 10 carbon atoms)

Answer: <https://biology-forums.com/index.php?topic=1900149>

### Question 664

Arrange the following Newman projections of butane in order of energy.

- I

### Question 665

Which compound is more soluble in water? Briefly explain your choice.

$(\text{CH}_3)_2\text{NH}$  or  $\text{CH}_3\text{CH}_2\text{CH}_3$

Answer: <https://biology-forums.com/index.php?topic=1897304>

### Question 666

How many molecules of fatty acid are needed to produce one molecule of a fat or oil?

- 1
- 6
- 3

- 2
- 1.5

Answer: <https://biology-forums.com/index.php?topic=1900104>

### Question 667

Draw structures which show the hydrogen bonding interaction that exists between water and dimethyl ether.

Answer: <https://biology-forums.com/index.php?topic=1899483>

### Question 668

Which of the following is a bridged bicyclic alkane?

- bicyclo[3.2.0]heptane
- bicyclo[2.2.1]heptane
- bicyclo[4.1.0]heptane
- cis-decalin
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897467>

### Question 669

At low temperatures, long-chain polymers are usually \_\_\_\_\_.

- glasses
- thermoplastics
- very flexible
- highly cross-linked
- gummy

Answer: <https://biology-forums.com/index.php?topic=1900328>

### Question 670

When two carbenes collide, they immediately dimerize to give \_\_\_\_\_.

- an aromatic ring
- a carbanion
- an alkene
- an alkane
- an alkyne

Answer: <https://biology-forums.com/index.php?topic=1897593>

### Question 671

Which of the following amino acids has a nonpolar side chain?

- aspartic acid
- serine
- asparagine
- leucine
- threonine

Answer: <https://biology-forums.com/index.php?topic=1899965>

### Question 672

Which of the following reagents will convert 1 mole of 3-methylpent-1-yne into 3-methylpentane?

- 2 moles of HCl
- 1 mole H<sub>2</sub>, Ni and heat
- 2 moles H<sub>2</sub>, Ni and heat
- 2 moles of Cl<sub>2</sub> in CCl<sub>4</sub>
- 1 mole of Br<sub>2</sub> in CCl<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1898248>

### Question 673

Draw a structure for the expected product of the following reaction.

Answer: <https://biology-forums.com/index.php?topic=1898813>

### Question 674

A D-aldopentose is subjected to Kiliani-Fischer chain lengthening and the resulting mixture is oxidized using nitric acid. The two distinct products both show optical activity. From this one can conclude that the original D-aldopentose \_\_\_\_\_.

- must be D-lyxose
- must be D-ribose
- is either D-ribose or D-arabinose
- is either D-xylose or D-arabinose
- must be D-xylose

Answer: <https://biology-forums.com/index.php?topic=1899936>

### Question 675

Provide a picture of the LUMO of 1,3,5-hexatriene.

Answer: <https://biology-forums.com/index.php?topic=1899688>

### Question 676

Which of the following compounds would most likely be used in the preparation of isobutylbenzene from benzene?

- $(\text{CH}_3)_2\text{CHCOCl}$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCl}$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$
- $(\text{CH}_3)_2\text{CHCH}_2\text{Br}$
- $(\text{CH}_3)_2\text{CHCH}_2\text{Cl}$

Answer: <https://biology-forums.com/index.php?topic=1898591>

### Question 677

Why are alcohols unreactive toward nucleophilic substitution reactions?

Answer: <https://biology-forums.com/index.php?topic=1898456>

### Question 678

Provide the structure of cyclohexanone oxime.

Answer: <https://biology-forums.com/index.php?topic=1898706>

### Question 679

When 1-bromo-2, 2-dimethylcyclopentane is heated in ethanol, one of the products which results is shown below. Provide a detailed, stepwise mechanism for the production of this compound, and give the name of the mechanism by which it is produced.

Answer: <https://biology-forums.com/index.php?topic=1897844>

### Question 680

How many distinct terminal alkynes exist with a molecular formula of  $\text{C}_5\text{H}_8$

- \* 1
- \* 2
- \* 3
- \* 4
- \* 5

Answer: <https://biology-forums.com/index.php?topic=1898144>

### Question 681

Show the best method for preparing methoxycyclopentane via the Williamson ether synthesis.

Answer: <https://biology-forums.com/index.php?topic=1899514>

### Question 682

Which of the following is an advantage of using an alkylbenzenesulfonate detergent over a common soap?

- Greases are not emulsified by soaps.
- Sulfonates are protonated at higher pH's than are carboxylates.
- The alkylbenzenesulfonate detergent has no hydrophobic region.
- Calcium, magnesium, and iron salts of sulfonic acids are soluble in water.
- The alkylbenzenesulfonate detergent is uncharged.

Answer: <https://biology-forums.com/index.php?topic=1900161>

### Question 683

There is one more important resonance form for the structure below. Draw it and then indicate the hybridization of all of the non-H atoms.

Answer: <https://biology-forums.com/index.php?topic=1897261>

### Question 684

The methyl ester of a carboxylic acid can be synthesized directly using \_\_\_\_\_.

- C<sub>2</sub>O<sub>2</sub>Cl<sub>2</sub>
- PCl<sub>5</sub>
- CH<sub>3</sub>NH<sub>2</sub>
- SOCl<sub>2</sub>
- CH<sub>2</sub>N<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1898935>

### Question 685

A mixture of hept-1-yne, hept-2-yne, and hept-3-yne was hydrogenated in the presence of a platinum catalyst until hydrogen uptake ceased. If one assumes that the hydrogenation went to completion, how many different seven-carbon hydrocarbons were produced?

- 1
- 2
- 3
- 6
- 8

Answer: <https://biology-forums.com/index.php?topic=1898253>

### Question 686

The specific rotation of pure (-)-2-butanol is -13.5°. If a mixture has a specific rotation of +7°, how much of each form (+ and-) is present and what is the e.e. of the mixture?

Answer: <https://biology-forums.com/index.php?topic=1897685>

### Question 687

Which sequence of steps below describes the best synthesis of 5-oxohexanoic acid starting with 1-methylcyclopentan-1-ol?

- 1. H<sub>2</sub>SO<sub>4</sub> and heat 2. O<sub>3</sub> 3. (CH<sub>3</sub>)<sub>2</sub>S 4. PCC
- 1. Conc. KMnO<sub>4</sub> 2. Dry gaseous HBr 3. mg/ether 4. CO<sub>2</sub>
- 1. H<sub>2</sub>SO<sub>4</sub> and heat 2. Conc. KMnO<sub>4</sub> 3. LiAlH<sub>4</sub> 4. H<sub>3</sub>O<sup>+</sup>
- 1. Conc. KMnO<sub>4</sub> 2. CH<sub>3</sub>MgBr/ ether 3. H<sub>3</sub>O<sup>+</sup>
- 1. H<sub>2</sub>SO<sub>4</sub> and heat 2. Conc. KMnO<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1898926>

### Question 688

Why do acetal-forming reactions that use ethylene glycol have more favorable equilibrium constants than those using methanol?

- They are more favorable on entropy grounds.
- They are more favorable on enthalpy grounds.
- Ethylene glycol reacts more rapidly.
- The ethylene acetal can serve as a protecting group.
- Ethylene glycol is acidic and catalyzes the reaction.

Answer: <https://biology-forums.com/index.php?topic=1898714>

### Question 689

Which of the following reagents can be used to convert cyclopentanol to cyclopentane?

- TsCl, pyridine followed by LiAlH<sub>4</sub>
- NaBH<sub>4</sub> followed by H<sub>3</sub>O<sup>+</sup>
- Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>, H<sub>2</sub>SO<sub>4</sub>
- H<sub>2</sub>SO<sub>4</sub>, heat followed by H<sub>2</sub>, Pt
- both A and D

Answer: <https://biology-forums.com/index.php?topic=1898486>

### Question 690

What peptide coupling reagent is most commonly used in solid phase peptide synthesis?

Answer: <https://biology-forums.com/index.php?topic=1900073>

### Question 691

Which of the following improperly describes the physical properties of an alkyne?

- nearly insoluble in water
- less dense than water
- relatively nonpolar
- boiling point nearly the same as an alkane with similar carbon skeleton
- insoluble in most organic solvents

Answer: <https://biology-forums.com/index.php?topic=1898207>

### Question 692

Draw the structure of (2R,3S)-2,3-dichloropentane. Take particular care to indicate three-dimensional stereochemical detail properly.

Answer: <https://biology-forums.com/index.php?topic=1897657>

### Question 693

Hept-3-yne yields what acids upon treatment with concentrated permanganate of ozone followed by water?

Answer: <https://biology-forums.com/index.php?topic=1898924>

### Question 694

For what does the acronym HOMO stand?

Answer: <https://biology-forums.com/index.php?topic=1899648>

### Question 695

Provide the preferred reagent pair to synthesize 3-ethylpent-2-ene via a Wittig reaction.

Answer: <https://biology-forums.com/index.php?topic=1898693>

### Question 696

The twisted boat conformation of cyclohexane is actually a slightly lower energy conformation than the boat conformation. Which of the following accurately describes one factor involved in this structural behavior?

- fewer unfavorable steric factors in the twisted boat
- lower bond strain in the boat
- lower angle strain in the boat
- increased rotational freedom in the boat
- higher torsional strain in the twisted boat

Answer: <https://biology-forums.com/index.php?topic=1897441>

### Question 697

In trans-hept-4-en-2-yne the shortest carbon-carbon bond is between carbons \_\_\_\_\_.

- 1 and 2
- 2 and 3
- 3 and 4
- 4 and 5
- 6 and 7

Answer: <https://biology-forums.com/index.php?topic=1898214>

### Question 698

Since alkyl groups are electron donors, one might conclude that tertiary amines are much more basic than primary amines. Actually, primary and tertiary amines show similar ranges of basicity. Offer an explanation.

Answer: <https://biology-forums.com/index.php?topic=1898779>

### Question 699

Energy is \_\_\_\_\_ when bonds are formed and is \_\_\_\_\_ when bonds are broken; therefore, bond dissociation energies are always \_\_\_\_\_.

- released; consumed; endothermic
- consumed; released; exothermic
- released; consumed; exothermic
- consumed; released; endothermic
- consumed; released; isothermic

Answer: <https://biology-forums.com/index.php?topic=1897528>

### Question 700

What is the major constituent of natural gas?

- butane
- methane
- octane
- propane
- ethane

Answer: <https://biology-forums.com/index.php?topic=1897394>

### Question 701

Reaction of ethylmagnesium bromide with which of the following compounds yields a secondary alcohol after quenching with aqueous acid?

- ethylene oxide
- n-butyllithium
- $(\text{CH}_3)_2\text{CO}$
- $\text{H}_2\text{CO}$
- $\text{CH}_3\text{CHO}$

Answer: <https://biology-forums.com/index.php?topic=1898366>

### Question 702

$^1\text{H}$  nuclei located near electronegative atoms tend to be \_\_\_\_\_ relative to  $^1\text{H}$  nuclei which are not.

- shielded
- deshielded
- split
- resonanced
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899318>

### Question 703

When linoleic acid is hydrogenated, what organic compound is produced and how does its melting point compare to that of linoleic acid?

Answer: <https://biology-forums.com/index.php?topic=1900127>

### Question 704

In the mass spectrum of pentanoic acid, the base peak occurs at  $m/z$  \_\_\_\_\_.

- 102
- 73
- 60
- 101
- 85

Answer: <https://biology-forums.com/index.php?topic=1898897>

### Question 705

Which of the following functional groups does not have at least one  $\text{sp}^2$  hybridized carbon atom as a constituent of the group?

- ether
- carboxylic acid
- alkene
- ester
- aldehyde

Answer: <https://biology-forums.com/index.php?topic=1897319>

### Question 706

Using ethanol as your only source of carbon compounds and using any other necessary inorganic reagents, propose a synthesis of ethyl acetate.

Answer: <https://biology-forums.com/index.php?topic=1899046>

### Question 707

What two atomic orbitals or hybrid atomic orbitals overlap to form the  $\text{C}-\text{O}$  bond in ethanol?

- $\text{C sp}^2 + \text{O sp}^2$
- $\text{C sp}^3 + \text{O sp}^3$
- $\text{C sp}^3 + \text{O sp}^2$

- C sp<sup>2</sup> + O sp<sup>3</sup>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898298>

### Question 708

Explain why polyamides tend to be crystalline polymers.

Answer: <https://biology-forums.com/index.php?topic=1900337>

### Question 709

When a SN<sub>1</sub> reaction of R-2-iodobutane takes place in hot methanol, the product \_\_\_\_\_.

- will rotate plane polarized light
- is chiral
- is racemic
- will undergo a hydride shift
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897830>

### Question 710

Which of the following terms best describes the compound below?

- a cis A-B steroid
- a sesquiterpene
- a synthetic detergent
- a complex lipid
- a trans A-B steroid

Answer: <https://biology-forums.com/index.php?topic=1900185>

### Question 711

Which of the following statements is true?

- The carbonyl carbon in a carboxylic acid does not give a <sup>13</sup>C signal in a <sup>13</sup>C-NMR spectrum.
- The carbonyl carbon in a carboxylic acid gives a <sup>13</sup>C signal in the same region as a carbonyl carbon from an ester or amide in the range of 150 to 180 ppm.
- The carbonyl carbon in a carboxylic acid cannot be distinguished from an aromatic carbon because they both give signals in the range of 110 to 130 ppm.
- The carbonyl carbon of a carboxylic acid splits a proton signal into a doublet in an H-NMR spectrum.
- The carbonyl carbon in a carboxylic acid gives a <sup>13</sup>C signal in the same region as a carbonyl carbon from a ketone or aldehyde — in the range of 200 ppm.

Answer: <https://biology-forums.com/index.php?topic=1898895>

### Question 712

An acid which could not be prepared from an organic halide by carboxylation of the Grignard reagent is \_\_\_\_\_.

- 2,2-dimethylpropanoic acid
- 4-oxocyclohexanecarboxylic acid
- 2-methylbutanoic acid
- propanoic acid
- benzoic acid

Answer: <https://biology-forums.com/index.php?topic=1898906>

### Question 713

Provide the name of the major alkene product that results when (2S,3R)-2-bromo-3-methylpentane is treated with sodium methoxide in methanol.

Answer: <https://biology-forums.com/index.php?topic=1898000>

### Question 714

Predict the product that results from 2-methylamino-1-ethanol being treated with phosgene.

Answer: <https://biology-forums.com/index.php?topic=1899074>

### Question 715

Describe the number of signals and their splitting in the <sup>1</sup>H NMR spectrum of (CH<sub>3</sub>)<sub>2</sub>CHOCH<sub>3</sub>.

- 3 signals: 2 doublets and a septet

- 3 signals: a singlet, a doublet, and a septet
- 2 signals: a doublet and a septet
- 4 signals: 2 doublets, a singlet, and a septet
- 3 signals: a doublet, a quartet, and a septet

Answer: <https://biology-forums.com/index.php?topic=1899341>

### Question 716

Draw (2R, 3S) 2-bromopentan-1,3-diol in a Fischer projection.

Answer: <https://biology-forums.com/index.php?topic=1898319>

### Question 717

When light is shined on a mixture of chlorine and chloromethane, carbon tetrachloride is one of the components of the final reaction mixture. Propose a series of mechanistic steps which explain this observation.

Answer: <https://biology-forums.com/index.php?topic=1897493>

### Question 718

Provide a model that shows why the less stable Z isomer is formed in this reaction shown.

Answer: <https://biology-forums.com/index.php?topic=1898001>

### Question 719

What alkene, which contains no oxygen atoms and a single CC, will give benzophenone (shown below) as the only product upon treatment with O<sub>3</sub> followed by reaction with dimethyl sulfide.

Answer: <https://biology-forums.com/index.php?topic=1898138>

### Question 720

Between T<sub>g</sub> and T<sub>m</sub>, crystalline polymers exist as \_\_\_\_\_.

- thermoplastics which are flexible and moldable
- liquids which are flexible and moldable
- glasses of low flexibility
- thermoplastics which are readily extruded to form fibers
- liquids which are readily extruded to form fibers

Answer: <https://biology-forums.com/index.php?topic=1900329>

### Question 721

What information does the intensity (integration) of a signal in the <sup>1</sup>H NMR spectrum give you?

- how many neighboring protons are present
- how many different types of protons are present
- how many protons of each type are present
- the electronic structure of the molecule close to each type of proton

Answer: <https://biology-forums.com/index.php?topic=1899319>

### Question 722

Using any alkene as a starting material, how would you make the compound shown below?

Answer: <https://biology-forums.com/index.php?topic=1898096>

### Question 723

Given the pK<sub>a</sub> values for the two acids below, what would you expect the K<sub>eq</sub> for this reaction to be?

- K<sub>eq</sub> < 1
- K<sub>eq</sub> = 1
- K<sub>eq</sub> > 1
- You can't tell from the information given.

Answer: <https://biology-forums.com/index.php?topic=1897507>

### Question 724

Which of the following compounds has the most signals in the proton-decoupled <sup>13</sup>C NMR spectrum?

- 1,2,3,4-tetrabromobenzene



- 1,3,5-tribromobenzene
- m-dibromobenzene
- o-dibromobenzene
- p-dibromobenzene

Answer: <https://biology-forums.com/index.php?topic=1899825>

### Question 725

Dimethyl ether (CH<sub>3</sub>OCH<sub>3</sub>) can be prepared by heating methanol in concentrated H<sub>2</sub>SO<sub>4</sub>. Provide a detailed, stepwise mechanism for this process.

Answer: <https://biology-forums.com/index.php?topic=1898492>

### Question 726

Why does the diene shown below fail to undergo a Diels-Alder reaction with even the most reactive dienophiles?

Answer: <https://biology-forums.com/index.php?topic=1899681>

### Question 727

When acetaldehyde (CH<sub>3</sub>CHO) is deprotonated, the resulting anion is stabilized by resonance. Draw the major resonance contributing forms of this anion.

Answer: <https://biology-forums.com/index.php?topic=1897597>

### Question 728

Calculate the empirical and molecular formulas of the compound with molecular weight 122 and an elemental analysis of 59.01% C, 4.97% H, 13.12% O, and 22.90% N.

Answer: <https://biology-forums.com/index.php?topic=1897120>

### Question 729

Which of the following is not a true statement?

- Oxiranes are three-membered ring ethers.
- Pyrans are six-membered-ring ethers.
- Dioxanes are six-membered ring ethers.
- Furans are five-membered ring ethers.
- Oxetanes are five-membered ring ethers.

Answer: <https://biology-forums.com/index.php?topic=1899492>

### Question 730

Which of the following is most acidic?

- acetoacetic ester
- malonic ester
- acetone
- ethyl acetate
- acetaldehyde

Answer: <https://biology-forums.com/index.php?topic=1899162>

### Question 731

Octyl acetate (shown below) is an ester that has a strong orange odor. What acid chloride and alcohol would you mix together to make this ester?

Answer: <https://biology-forums.com/index.php?topic=1898506>

### Question 732

Which of the following structures, if flat, would be classified as antiaromatic?

- 
- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1899733>

### Question 733

Consider rotation about the C3-C4 bond of hexane, and draw the Newman projection for the most stable conformation.

Answer: <https://biology-forums.com/index.php?topic=1897417>

### Question 734

The synthetic steroid RU-486 is shown below. How many pi bonds does RU-486 contain?

Answer: <https://biology-forums.com/index.php?topic=1897266>

### Question 735

Write the structures of all of the monobromination products of 1,1,3,3-tetramethylcyclobutane.

Answer: <https://biology-forums.com/index.php?topic=1897564>

### Question 736

How might one distinguish an aldehyde from a ketone using IR data alone?

Answer: <https://biology-forums.com/index.php?topic=1898654>

### Question 737

What type of solvent is best for SN2 reactions which employ anionic nucleophiles: polar, protic solvents; polar, aprotic solvents; or nonpolar solvents? Explain.

Answer: <https://biology-forums.com/index.php?topic=1897798>

### Question 738

Which of the following amino acids does not have an aromatic substructure within its side chain?

- phenylalanine
- proline
- tryptophan
- tyrosine
- histidine

Answer: <https://biology-forums.com/index.php?topic=1899975>

### Question 739

When 3-iodo-3-ethylpentane is heated in methanol, the major organic product is an \_\_\_\_\_ that is generated through an \_\_\_\_\_ mechanism.

- ether; E1
- alcohol; E1
- ether; SN2
- alkene; E2
- ether; SN1

Answer: <https://biology-forums.com/index.php?topic=1897879>

### Question 740

Can 1-hexanamine be prepared in good yield from the reaction of a 1:1 molar ratio of ammonia and 1-bromohexane? Why or why not?

Answer: <https://biology-forums.com/index.php?topic=1898808>

### Question 741

Provide the structure of natural rubber.

Answer: <https://biology-forums.com/index.php?topic=1900276>

### Question 742

Which is more basic, pyridine or pyrrole? Explain.

Answer: <https://biology-forums.com/index.php?topic=1899770>

### Question 743

Describe a sequence of reactions by which meso-hexane-3,4-diol can be straightforwardly prepared from hex-3-yne.

Answer: <https://biology-forums.com/index.php?topic=1898279>

### Question 744

Which compound generates positive peaks for the carbonyl in both its DEPT-90 and DEPT-135 spectra?

- H<sub>2</sub>CO

- $\text{CH}_3\text{CH}_2\text{CONH}_2$
- $\text{CH}_3\text{CH}_2\text{COCH}_3$
- $\text{CH}_3\text{CO}_2\text{CH}_2\text{CH}_3$
- $\text{CH}_3\text{CH}_2\text{CHO}$

Answer: <https://biology-forums.com/index.php?topic=1899365>

### Question 745

Provide the name of the major organic product that results when (R)-2-methyl-3-pentanol is heated with conc.  $\text{H}_2\text{SO}_4$ .

Answer: <https://biology-forums.com/index.php?topic=1898494>

### Question 746

The first mechanistic step in the direct reaction of an amine with a carboxylic acid to produce an amide is \_\_\_\_\_.

- loss of  $\text{N}_2$
- loss of  $\text{H}_2\text{O}$
- an acid-base reaction
- loss of  $\text{CO}_2$
- nucleophilic attack on the carbonyl carbon

Answer: <https://biology-forums.com/index.php?topic=1898938>

### Question 747

Mark all the structures below that contain an inorganic ester. (More than one answer is possible.)

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1898510>

### Question 748

When o-fluorotoluene is treated with sodium amide, the product is \_\_\_\_\_.

- a mixture of o- and m-toluidine.
- only o-toluidine
- only m-toluidine
- a mixture of o- and p-toluidine
- only p-toluidine

Answer: <https://biology-forums.com/index.php?topic=1898603>

### Question 749

Predict the major monobromination product in the following reaction.

Answer: <https://biology-forums.com/index.php?topic=1897567>

### Question 750

Provide the structure of 1-bromo-3-methylhexane.

Answer: <https://biology-forums.com/index.php?topic=1897767>

### Question 751

When spermaceti is heated in aqueous potassium hydroxide, and \_\_\_\_\_ are formed. Provide the structure of spermaceti.

Answer: <https://biology-forums.com/index.php?topic=1900099>

### Question 752

Draw a correct Lewis structure for chloromethane,  $\text{CH}_3\text{Cl}$ , including all non-bonding lone pairs.

Answer: <https://biology-forums.com/index.php?topic=1897161>

### Question 753

How many distinct alkene products results when 1-bromo-1-ethylcyclopentane is treated with  $\text{NaOCH}_3$ ?

- 1
- 2
- 3

• 4

Answer: <https://biology-forums.com/index.php?topic=1897850>

### Question 754

What is the major organic product that results when 3-heptyne is hydrogenated in the presence of Lindlar's catalyst?

- 2-heptyne
- (Z)-2-heptene
- (Z)-3-heptene
- (E)-3-heptene
- heptane

Answer: <https://biology-forums.com/index.php?topic=1898256>

### Question 755

A sample of compound X is subjected to elemental analysis and the following percentages by weight are found: 39.97% C, 6.73% H, and 53.30% O. The molecular weight of X is 90. What is the empirical formula of X?

- C<sub>4</sub>H<sub>10</sub>O<sub>2</sub>
- CH<sub>2</sub>O
- C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>
- C<sub>3</sub>H<sub>6</sub>O<sub>3</sub>
- C<sub>6</sub>H<sub>8</sub>O

Answer: <https://biology-forums.com/index.php?topic=1897119>

### Question 756

Provide a series of synthetic steps by which p-nitrobutylbenzene can be prepared from benzene.

Answer: <https://biology-forums.com/index.php?topic=1898615>

### Question 757

Which of the following compounds is a 2° amine?

- N-ethylaniline
- cyclohexylamine
- N,N-diethylaniline
- N-butylpyridinium bromide
- t-butylamine

Answer: <https://biology-forums.com/index.php?topic=1898759>

### Question 758

What product results when pentanal is heated with sodium hydroxide?

Answer: <https://biology-forums.com/index.php?topic=1899134>

### Question 759

Proteins which provide all the essential amino acids in about the right proportions are called \_\_\_\_\_.

- glycoproteins
- complete proteins
- globular proteins
- enzymes
- nucleoproteins

Answer: <https://biology-forums.com/index.php?topic=1899971>

### Question 760

Provide the sequence of reagents needed to convert (CH<sub>3</sub>CH<sub>2</sub>O<sub>2</sub>C)<sub>2</sub>CH<sub>2</sub> to 2,5-dimethylhexanoic acid.

Answer: <https://biology-forums.com/index.php?topic=1899168>

### Question 761

How many distinct monochlorinated products can result when isobutane is subjected to free radical chlorination?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1897558>

### Question 762

When an arenediazonium ion reacts with an activated aromatic ring, the product is \_\_\_\_\_.

- a benzonitrile
- an aniline
- an azo compound
- a nitrosamine

Answer: <https://biology-forums.com/index.php?topic=1898849>

### Question 763

Which of the following cycloalkanes has the smallest heat of combustion per CH<sub>2</sub> group?

- cyclobutane
- cyclopropane
- cyclohexane
- cyclopentane
- cycloheptane

Answer: <https://biology-forums.com/index.php?topic=1897437>

### Question 764

Which of the following is an intermediate in the bromination of toluene?

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1898549>

### Question 765

How does the O-H stretch in the IR spectrum of a carboxylic acid differ from the O-H stretch of an alcohol?

Answer: <https://biology-forums.com/index.php?topic=1899254>

### Question 766

Acid chlorides can be prepared from carboxylic acids by treatment with \_\_\_\_\_.

- (COCl)<sub>2</sub>
- SOCl<sub>2</sub>
- KCl
- both A and B
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1898954>

### Question 767

In nucleophilic acyl substitution \_\_\_\_\_.

- an S<sub>N</sub>2 reaction occurs
- addition to the carbonyl by a nucleophile is followed by loss of the leaving group
- loss of the leaving group is followed by rearrangement of the carbocation
- ester hydrolysis is followed by deprotonation
- protonation of the carbonyl is followed immediately by loss of the leaving group

Answer: <https://biology-forums.com/index.php?topic=1899005>

### Question 768

Provide the structure of lithium diisopropylamide.

Answer: <https://biology-forums.com/index.php?topic=1899091>

### Question 769

What sequence of reagents is needed to convert 2-chlorobutane into 3-methyl-4-heptanol?

Answer: <https://biology-forums.com/index.php?topic=1898370>

### Question 770

How might one distinguish a sample of n-butylamine from a sample of diethylamine using IR spectroscopy?

Answer: <https://biology-forums.com/index.php?topic=1898790>

### Question 771

Is it theoretically possible to separate the pair of compounds below by distillation? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1897729>

### Question 772

Draw the product when trans-hex-3-ene reacts with MMPP in ethanol.

Answer: <https://biology-forums.com/index.php?topic=1898137>

### Question 773

What are the products from the reaction of excess methyl magnesium bromide with ethyl acetate followed by H<sub>3</sub>O<sup>+</sup>?

Answer: <https://biology-forums.com/index.php?topic=1899040>

### Question 774

Which of the following compounds is the most stable?

- 2-methyl-2,3-pentadiene
- 2-methyl-1,2-pentadiene
- (Z)-2-methyl-1,3-pentadiene
- (E)-2-methyl-1,3-pentadiene
- 2-methyl-1,4-pentadiene

Answer: <https://biology-forums.com/index.php?topic=1899583>

### Question 775

Why are fats more efficient sources of long-term energy than carbohydrates?

Answer: <https://biology-forums.com/index.php?topic=1900108>

### Question 776

Provide a detailed, stepwise mechanism for the reaction of propanoyl chloride with ammonia.

Answer: <https://biology-forums.com/index.php?topic=1899045>

### Question 777

\_\_\_\_\_ lipids are those that can be easily hydrolyzed to simpler constituents.

Answer: <https://biology-forums.com/index.php?topic=1900088>

### Question 778

Which of the following alkyl halides is most likely to undergo rearrangement in an S<sub>N</sub>1 reaction?

- 1-bromo-4-methylcyclohexane
- 3-chloropentane
- 3-bromopentane
- 2-chloro-3,3-dimethylpentane
- bromocyclohexane

Answer: <https://biology-forums.com/index.php?topic=1897836>

### Question 779

Given a reaction in which reactant A is converted only to product B at 25°C, what K<sub>eq</sub> results if at equilibrium 80% of A has become B?

Answer: <https://biology-forums.com/index.php?topic=1897500>

### Question 780

Provide the structure of the Claisen product in the self condensation of methyl phenylacetate.

Answer: <https://biology-forums.com/index.php?topic=1899149>

### Question 781

Which of the following reagents convert(s) benzoyl chloride to phenyl propyl ketone?

- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>MgBr
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>Li

- $(\text{CH}_3\text{CH}_2\text{CH}_2)_2\text{CuLi}$
- both A and B
- both A and C

Answer: <https://biology-forums.com/index.php?topic=1899039>

### Question 782

Which of the following oils has the highest percentage of saturated fatty acid?

- soybean oil
- canola oil
- herring oil
- olive oil

Answer: <https://biology-forums.com/index.php?topic=1900125>

### Question 783

You have a sample and its  $^1\text{H}$  NMR spectrum. You know your sample contains O atoms but not N atoms, and you suspect that your sample may be an alcohol. What common spectroscopic technique might you use to confirm your suspicion?

Answer: <https://biology-forums.com/index.php?topic=1899355>

### Question 784

Draw the LUMO of pentadienyl cation.

Answer: <https://biology-forums.com/index.php?topic=1899639>

### Question 785

Use the structure below to state the relationship between the indicated protons as equivalent, enantiotopic, diastereotopic, or unrelated.

$\text{H}_a$  &  $\text{H}_b$ :

$\text{H}_a$  &  $\text{H}_c$ :

$\text{H}_b$  &  $\text{H}_c$ :

Answer: <https://biology-forums.com/index.php?topic=1899351>

### Question 786

Which of the following terms best describes the pair of compounds shown: enantiomers, diastereomers, or the same compound?

Answer: <https://biology-forums.com/index.php?topic=1897706>

### Question 787

What compound results when benzoic acid reacts with methylamine, and what compound ultimately results when the initially formed compound is heated at

Answer: <https://biology-forums.com/index.php?topic=1899059>

### Question 788

Provide the structure of the major organic product which results when  $\text{PhCH}_2\text{CHO}$  is treated with  $\text{NaOH}$ .

Answer: <https://biology-forums.com/index.php?topic=1899129>

### Question 789

Provide two circumstances under which solvolysis of a chiral alkyl halide would not result in the generation of a mixture of enantiomeric products.

Answer: <https://biology-forums.com/index.php?topic=1897834>

### Question 790

What type of intermediate is present in the  $\text{S}_{\text{N}}2$  reaction of cyanide with bromoethane?

- carbene
- free radical
- carbanion
- carbocation
- This reaction has no intermediate.

Answer: <https://biology-forums.com/index.php?topic=1897785>

### Question 791

What compound results when ethyl benzoate is stirred in methanol containing a trace of  $\text{HCl}$  and by what name is this process known?

Answer: <https://biology-forums.com/index.php?topic=1899015>

### Question 792

Draw the structures of the two major products formed in the following reaction. Indicate which of the two structures would be predicted to predominate under thermodynamic condition and explain why.

Answer: <https://biology-forums.com/index.php?topic=1897783>

### Question 793

Draw the most stable conformation of (2Z,4E)-2,4-hexadiene.

Answer: <https://biology-forums.com/index.php?topic=1899598>

### Question 794

What compound exhibits three singlets in its proton spin decoupled  $^{13}\text{C}$  NMR spectrum?

- $\text{BrCH}_2\text{CH}_2\text{CH}_2\text{Cl}$
- $(\text{CH}_3)_2\text{CHOCH}(\text{CH}_3)_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
- $(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)_2$
- $\text{BrCH}_2\text{CH}_2\text{CH}_2\text{Br}$

Answer: <https://biology-forums.com/index.php?topic=1899368>

### Question 795

The bond dissociation energy is the amount of energy required to break a bond \_\_\_\_\_.

- homolytically
- via hydrogenation
- heterolytically
- so as to produce the more stable pair of ions
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897523>

### Question 796

Describe the hybridization of the cationic center and predict the CCC bond angle in  $(\text{CH}_3)_3\text{C}^+$ .

Answer: <https://biology-forums.com/index.php?topic=1897604>

### Question 797

Which of the following is a secondary halide?

- $\text{ClCH}_2\text{CH}_2\text{CH}(\text{CH}_3)_2$
- $(\text{CH}_3)_3\text{CClCH}_3$
- $\text{ClCH}_2\text{C}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- $\text{ClCH}_2\text{CH}_2\text{C}(\text{CH}_3)_3$
- $(\text{CH}_3)_2\text{CClCH}_2\text{CH}_3$

Answer: <https://biology-forums.com/index.php?topic=1897758>

### Question 798

Arrange the following conformers of butane in order of energy, lowest to highest: eclipsed, totally eclipsed, gauche, and anti.

Answer: <https://biology-forums.com/index.php?topic=1897418>

### Question 799

Draw the most stable conformation of trans-decalin.

Answer: <https://biology-forums.com/index.php?topic=1897471>

### Question 800

In biosynthesis, which amino acid serves as the source of the amino group for other amino acids?

- racemic phenylalanine
- L-phenylalanine
- D-phenylalanine
- L-glutamic acid
- D-glutamic acid

Answer: <https://biology-forums.com/index.php?topic=1900024>



### Question 801

Phospholipids are generally produced from the phosphatidate core structure with a polar head modifying group such as choline. However, a phospholipid called sphingomyelin (see below) is found abundantly in brain and fast neurons. Circle and label all structural features of sphingomyelin which are different from lecithin.

Answer: <https://biology-forums.com/index.php?topic=1900178>

### Question 802

Rank the following compounds in order of increasing acidity: CH<sub>3</sub>OH, HCl, NH<sub>3</sub>, and CH<sub>4</sub>.

Answer: <https://biology-forums.com/index.php?topic=1897134>

### Question 803

Phenol is more acidic than cyclohexanol because of the resonance stabilization of the phenoxide ion. Draw the proton transfer reaction that take place between sodium hydroxide and phenol. Then show the resonance structures that can be drawn for the phenoxide ion.

Answer: <https://biology-forums.com/index.php?topic=1898411>

### Question 804

When pyridine undergoes electrophilic aromatic substitution, at which position does substitution occur?

- 3-position
- 2-position
- 4-position
- At all positions equally

Answer: <https://biology-forums.com/index.php?topic=1898797>

### Question 805

Which of the following is a tertiary halide?

- (CH<sub>3</sub>)<sub>3</sub>CCCHClCH<sub>3</sub>
- (CH<sub>3</sub>)<sub>2</sub>CCClCH<sub>2</sub>CH<sub>3</sub>
- ClCH<sub>2</sub>CH<sub>2</sub>CH(CH<sub>3</sub>)<sub>2</sub>
- ClCH<sub>2</sub>C(CH<sub>3</sub>)CH<sub>2</sub>CH<sub>3</sub>
- ClCH<sub>2</sub>CH<sub>2</sub>C(CH<sub>3</sub>)<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1897759>

### Question 806

When 1,1,3,3-tetramethylcyclobutane is brominated at 125°C, the relative reactivity of the 1°: 2°: 3° hydrogens is approximately 1:82:1600. Estimate the amount of each monobromination product.

Answer: <https://biology-forums.com/index.php?topic=1897579>

### Question 807

Which of the following terms correctly describe(s) the structural relationship between cis-1,3-dimethylcyclopentane and trans-1,3-dimethylcyclopentane?

- enantiomers
- diastereomers
- geometric isomers
- both A and C
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1897700>

### Question 808

In electrophilic aromatic substitution reactions, a -CO<sub>2</sub>H substituent on the aromatic ring is \_\_\_\_\_.

- a deactivator and a m-director
- an activator and an o,p-director
- a deactivator and an o,p-director
- an activator and a m-director
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898556>

### Question 809

Suggest a sequence of synthetic steps through which p-toluic acid can be prepared from toluene.

Answer: <https://biology-forums.com/index.php?topic=1898927>

### Question 810

The  $K_a$  of formic acid is  $1.7 \times 10^{-4}$ . The  $pK_a$  of formic acid is \_\_\_\_\_.

- 10.38
- 1.70
- 4.00
- 3.77
- -2.36

Answer: <https://biology-forums.com/index.php?topic=1897129>

### Question 811

Which of the following represents the correct ranking in terms of increasing boiling point?

- 2-butanone < n-butane < diethyl ether < 1-butanol
- n-butane < diethyl ether < 1-butanol < 2-butanone
- n-butane < 2-butanone < diethyl ether < 1-butanol
- n-butane < 1-butanol < diethyl ether < 2-butanone
- n-butane < diethyl ether < 2-butanone < 1-butanol

Answer: <https://biology-forums.com/index.php?topic=1898643>

### Question 812

What class of organic compound is the major product of the acid catalyzed reaction of an alcohol with a carboxylic acid?

- thiol
- ester
- nitrile
- ether
- sulfonate ester

Answer: <https://biology-forums.com/index.php?topic=1898500>

### Question 813

Draw a correct Lewis structure for acetonitrile,  $CH_3CN$ , including all non-bonding lone pairs.

Answer: <https://biology-forums.com/index.php?topic=1897167>

### Question 814

Based on the relative stabilities of the intermediates involved, explain the basis for Markovnikov's rule in the addition of hydrogen halides to alkenes.

Answer: <https://biology-forums.com/index.php?topic=1898030>

### Question 815

Which of the following indicators is commonly used to visualize bands of amino acids?

- ninhydrin
- bromocresol green
- vanillin dip
- potassium permanganate

Answer: <https://biology-forums.com/index.php?topic=1900034>

### Question 816

Which of the following statements correctly pertains to a pair of enantiomers?

- They have different melting points.
- They rotate the plane of polarized light by differing amounts and in the same direction.
- They rotate the plane of polarized light by exactly the same amount and in opposite directions.
- They rotate the plane of polarized light by differing amounts and in opposite directions.
- They have the same melting point, but they have different boiling points.

Answer: <https://biology-forums.com/index.php?topic=1897673>

### Question 817

Name the compound which results when propyl benzoate is heated in a large excess of ethanol in the presence of catalytic acid.

Answer: <https://biology-forums.com/index.php?topic=1899013>

### Question 818

What conditions could be used to isomerize hept-2-yne to hept-1-yne?

Answer: <https://biology-forums.com/index.php?topic=1898239>

### Question 819

Sodium hydride (NaH) is a base that is commonly used in organic reactions. The pKa of H<sub>2</sub> is 36. Which of the following compounds could not be used as a solvent if you were using NaH?

- 
- 
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>
- CH<sub>3</sub>CH<sub>2</sub>OH

Answer: <https://biology-forums.com/index.php?topic=1897336>

### Question 820

The C:H ratio present in most terpenes is \_\_\_\_\_.

- 3:8
- 4:5
- 2:6
- 5:8
- 1:2

Answer: <https://biology-forums.com/index.php?topic=1900198>

### Question 821

In a Diels-Alder reaction, what is the endo rule?

Answer: <https://biology-forums.com/index.php?topic=1899654>

### Question 822

What is the pKa of a terminal alkyne?

- 16
- 10
- 25
- 4
- 44

Answer: <https://biology-forums.com/index.php?topic=1898219>

### Question 823

Why are sulfonium salts good alkylating agents?

Answer: <https://biology-forums.com/index.php?topic=1899551>

### Question 824

List the following four carboxylic acid derivatives, ester, anhydride, amide, and acid halide, in order of increasing reactivity in nucleophilic acyl substitution reactions. Start with the least reactive derivative.

Answer: <https://biology-forums.com/index.php?topic=1899007>

### Question 825

What aryl halide would you use in the Suzuki reaction to make the following product?

Answer: <https://biology-forums.com/index.php?topic=1898604>

### Question 826

Heating a(n) \_\_\_\_\_ results in a Cope elimination.

- imine
- oxime
- enamine
- quaternary ammonium salt
- amine oxide

Answer: <https://biology-forums.com/index.php?topic=1898824>

### Question 827

Draw the most stable conformation of cis-1-ethyl-4-isopropylcyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897462>

### Question 828

What organic compounds result when tristearin is heated in aqueous sodium hydroxide?

Answer: <https://biology-forums.com/index.php?topic=1900158>

### Question 829

In an electrophoresis carried out at pH 9.0, does phenylalanine migrate toward the cathode, migrate toward the anode, or not migrate at all? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1900013>

### Question 830

Methanol has a pKa of 15.5. Calculate its Ka.

Answer: <https://biology-forums.com/index.php?topic=1897136>

### Question 831

What are the two most common unwanted side reactions which can occur when monosaccharides are treated with base?

- mutarotation and epimerization
- enediol rearrangement and glycoside formation
- epimerization and enediol rearrangement
- Ruff degradation and glycoside formation
- Kiliani-Fischer and Ruff degradations

Answer: <https://biology-forums.com/index.php?topic=1899890>

### Question 832

Show the most efficient use of the Williamson ether synthesis to prepare  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}(\text{CH}_3)_2$ .

Answer: <https://biology-forums.com/index.php?topic=1898514>

### Question 833

Which of the following statements best describes the relative bond dissociation energies of the sigma and pi bonds present in the carbon-carbon double bond of an alkene?

- sigma = pi
- pi > sigma
- sigma > pi
- cannot be estimated

Answer: <https://biology-forums.com/index.php?topic=1897886>

### Question 834

Can one prepare di-sec-butyl ether in good yield by heating butan-2-ol in the presence of sulfuric acid? Explain.

Answer: <https://biology-forums.com/index.php?topic=1899532>

### Question 835

Consider the possible thermal [4+4] cycloaddition of two molecules of 1,3-butadiene to generate cycloocta-1,5-diene. Show the HOMO/LUMO interaction which would result, and use this interaction to predict whether the proposed cycloaddition could occur.

Answer: <https://biology-forums.com/index.php?topic=1899690>

### Question 836

Which of the following amines is most basic?

- N,N-diethylaniline
- piperidine
- pyrrole
- aniline
- N-ethylaniline

Answer: <https://biology-forums.com/index.php?topic=1898776>

### Question 837

2-Methylbutan-1-ol is classified as \_\_\_\_\_.

- a tertiary alcohol
- a primary alcohol
- an enol
- a phenol
- a secondary alcohol

Answer: <https://biology-forums.com/index.php?topic=1898299>

### Question 838

Provide a Fischer projection of (2S,3S,4S)-2,3,4-trichloroheptane.

Answer: <https://biology-forums.com/index.php?topic=1897696>

### Question 839

Two equivalents of methyl magnesium bromide will add to \_\_\_\_\_.

- ketones
- secondary amines
- imines
- lactones
- aldehydes

Answer: <https://biology-forums.com/index.php?topic=1899037>

### Question 840

Treatment of hex-2-yne with mercuric sulfate in dilute sulfuric acid yields a mixture of two ketones. Similar treatment of hex-3-yne produces a single ketone instead of a mixture. Explain.

Answer: <https://biology-forums.com/index.php?topic=1898246>

### Question 841

Which of the following reasons best explains why aromatic protons have a larger chemical shift than protons one carbon removed from a halogen?

- A halogen is more electron withdrawing than an aromatic ring.
- Electron movement induces a magnetic field reinforcing the external field.
- Electron movement induces a magnetic field opposing the external field.
- An aromatic ring is more electron withdrawing than a halogen.

Answer: <https://biology-forums.com/index.php?topic=1899325>

### Question 842

Provide the major resonance structures of the ion which results when the most acidic hydrogen of cyclopentadiene is lost.

Answer: <https://biology-forums.com/index.php?topic=1899742>

### Question 843

Which line-angle formula corresponds to the chair conformation shown below?

- I
- II
- III
- IV

Answer: <https://biology-forums.com/index.php?topic=1897473>

### Question 844

Could L-proline be made using reductive amination? If so, show the starting material. If not, explain why.

Answer: <https://biology-forums.com/index.php?topic=1900027>

### Question 845

Provide the name of the major organic product that results when cyclopentanol is subjected to the following sequence of reactions: 1. NaH; 2. CH<sub>3</sub>CH<sub>2</sub>Br.

Answer: <https://biology-forums.com/index.php?topic=1898515>

### Question 846

List three commercial products which are composed primarily of alkanes.

Answer: <https://biology-forums.com/index.php?topic=1897400>

### Question 847

Which of the two 2° radicals below is more stable and why?

Answer: <https://biology-forums.com/index.php?topic=1897595>

### Question 848

The conjugate acid of ammonia, NH<sub>3</sub>, is \_\_\_\_\_.

- NH<sub>2</sub>OH
- NH<sub>4</sub><sup>+</sup>
- NH<sub>2</sub><sup>-</sup>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897128>

### Question 849

Which compound will show an intense peak in the mass spectrum at m/z 58?

- (CH<sub>3</sub>)<sub>3</sub>CCHO
- (CH<sub>3</sub>)<sub>3</sub>CCOCH<sub>3</sub>
- (CH<sub>3</sub>)<sub>2</sub>CHCOCH<sub>3</sub>
- CH<sub>3</sub>CH<sub>2</sub>COCH<sub>2</sub>CH<sub>3</sub>
- CH<sub>3</sub>COCH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1898647>

### Question 850

When a vegetable oil is partially hydrogenated, how is its structure altered and how is its melting point affected?

Answer: <https://biology-forums.com/index.php?topic=1900133>

### Question 851

Acids can be reduced to aldehydes by \_\_\_\_\_.

- treatment with LiAlH<sub>4</sub>
- conversion to the acid chloride followed by treatment with LiAlH[OC(CH<sub>3</sub>)<sub>3</sub>]<sub>3</sub>
- conversion to the amide followed by treatment with NaBH<sub>4</sub>
- conversion to the anhydride followed by treatment with Mg and H<sub>3</sub>O<sup>+</sup>
- conversion to the ester followed by treatment with LiAlH<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1899031>

### Question 852

Why are Friedel-Crafts acylation reactions not prone to polyacylation?

Answer: <https://biology-forums.com/index.php?topic=1898589>

### Question 853

Provide the condensed formulas of three structural isomers with molecular formula C<sub>5</sub>H<sub>12</sub> and arrange them in order of increasing boiling point.

Answer: <https://biology-forums.com/index.php?topic=1897284>

### Question 854

The isoelectric point is important in \_\_\_\_\_.

- determination of the C-terminal amino acid
- determination of the N-terminal amino acid
- electrophoresis
- the enzymatic resolution of amino acids
- the ninhydrin test

Answer: <https://biology-forums.com/index.php?topic=1900009>

### Question 855

Give structures for the three isomers with molecular formula C<sub>5</sub>H<sub>12</sub> and provide the common name of each.

Answer: <https://biology-forums.com/index.php?topic=1897382>

### Question 856

Which of the following alkyl halides has the smallest molecular dipole moment?

- CH<sub>3</sub>F
- CH<sub>2</sub>Cl<sub>2</sub>
- CH<sub>2</sub>I<sub>2</sub>
- CH<sub>3</sub>Cl
- CF<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1897773>

### Question 857

Provide the structure of the major organic product that results when 3-hexanol is treated with sodium dichromate.

Answer: <https://biology-forums.com/index.php?topic=1898433>

### Question 858

Which of the following amines is most soluble in water?

- pyrrolidine
- PhNH<sub>2</sub>
- ethylamine
- (CH<sub>3</sub>)<sub>3</sub>N
- (CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>NH

Answer: <https://biology-forums.com/index.php?topic=1898758>

### Question 859

How could you make the tripeptide Ala-Ala-Gly using the Merrifield Synthesis? Make sure to specify all the protecting groups needed.

Answer: <https://biology-forums.com/index.php?topic=1900070>

### Question 860

Alkenes \_\_\_\_\_.

- are reasonably soluble in water
- are relatively polar compounds
- have lower boiling points than alcohols of similar molecular weight
- both A and B
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897968>

### Question 861

What cyclic product results when octa-1,7-diene is subjected to ring closing metathesis?

Answer: <https://biology-forums.com/index.php?topic=1898135>

### Question 862

How might the two trimethylcyclohexane isomers shown below be most readily distinguished using NMR?

Answer: <https://biology-forums.com/index.php?topic=1899466>

### Question 863

3-Chlorocyclopropene is solvolyzed in methanol at a much higher rate than is chlorocyclopropane. Offer an explanation.

Answer: <https://biology-forums.com/index.php?topic=1899746>

### Question 864

Cyclic amides are called \_\_\_\_\_.

- aminsals
- lactams
- imines
- lactones
- animals

Answer: <https://biology-forums.com/index.php?topic=1898962>

### Question 865

Which of the following amines is the strongest base?

- p-iodoaniline
- piperidine
- imidazole
- cyclohexylamine
- pyrrole

Answer: <https://biology-forums.com/index.php?topic=1898777>

### Question 866

An oxygen atom has \_\_\_\_\_ valence electrons.

Answer: <https://biology-forums.com/index.php?topic=1897098>

### Question 867

Which of the following is a complex lipid?

- sodium palmitate
- tristearin
- testosterone
- b-carotene
- arachidic acid

Answer: <https://biology-forums.com/index.php?topic=1900091>

### Question 868

Provide the structure of the monomer from which poly(vinyl chloride) is formed.

Answer: <https://biology-forums.com/index.php?topic=1900231>

### Question 869

\_\_\_\_\_ polymers result from polymerization reactions in which chain growth is accompanied by loss of a small molecule.

- Latex
- Addition
- Chain-growth
- Condensation

Answer: <https://biology-forums.com/index.php?topic=1900210>

### Question 870

Provide the structure of tropylium bromide.

Answer: <https://biology-forums.com/index.php?topic=1899740>

### Question 871

Use the polygon rule to draw the MO energy diagram of the cyclononatetraenyl anion. Assuming planarity, would this ion be aromatic or antiaromatic?

Answer: <https://biology-forums.com/index.php?topic=1899721>

### Question 872

Which of the following alkenes can show geometric isomerism: 2,3-dichloro-2-pentene, 4-chloro-3-ethyl-3-hexene, 3-chloro-2-methyl-2-butene, and 3-chloro-2-methyl-1-butene?

Answer: <https://biology-forums.com/index.php?topic=1897913>

### Question 873

The pH of a 150 mL aqueous solution of  $2.13 \times 10^{-3}$  M HCl is \_\_\_\_\_.

- 3.000
- 2.672
- 2.130
- -3.000
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897122>



### Question 874

What is the IUPAC name of the compound shown below?

- (2R,3S,4R)-3,4-dibromo-2-chloro-3-methylhexane
- (2R,3R,4S)-3,4-dibromo-2-chloro-3-methylhexane
- (2R,3S,4S)-2-chloro-3,4-dibromo-3-methylhexane
- (2R,3S,4S)-3,4-dibromo-2-chloro-3-methylhexane
- (3S,4S,5S)-3,4-dibromo-5-chloro-4-methylhexane

Answer: <https://biology-forums.com/index.php?topic=1897765>

### Question 875

Provide a detailed, stepwise mechanism for the methylation of a carboxylic acid with diazomethane.

Answer: <https://biology-forums.com/index.php?topic=1898937>

### Question 876

Given that compound X has a molecular formula of C<sub>6</sub>H<sub>8</sub>O<sub>2</sub>, gave two peaks in its <sup>13</sup>C NMR spectrum (37 ppm and 208 ppm) but just one in its <sup>1</sup>H NMR spectrum (2.5 ppm), provide a structure for compound X.

Answer: <https://biology-forums.com/index.php?topic=1899436>

### Question 877

Provide the reagents necessary for carrying out the transformation of cyclopentane to cyclopentene.

Answer: <https://biology-forums.com/index.php?topic=1897994>

### Question 878

Ethylene glycol will react with phosgene to produce what organic compound?

Answer: <https://biology-forums.com/index.php?topic=1899075>

### Question 879

Provide the structure of syndiotactic polypropylene.

Answer: <https://biology-forums.com/index.php?topic=1900257>

### Question 880

What reagent could be used to convert allyl tosylate directly into oct-1-ene?

Answer: <https://biology-forums.com/index.php?topic=1899646>

### Question 881

Which of the following reagents is used to protect the amino group of the N-terminal residue in solution-phase peptide synthesis?

- phenyl isothiocyanate
- lithium diisopropyl amide
- dicyclohexylcarbodiimide
- trifluoroacetic acid
- benzyl chloroformate

Answer: <https://biology-forums.com/index.php?topic=1900069>

### Question 882

Circle and name the aromatic heterocycles in the following structure, which has been found to be effective against inflammatory diseases including Alzheimer's disease and rheumatoid arthritis (J. Med. Chem. 2007, 4728).

Answer: <https://biology-forums.com/index.php?topic=1899768>

### Question 883

Which alkanes have largely replaced Freons as propellants in aerosol cans?

- pentane and hexane
- propane and butane
- methane and ethane
- nonane and decane
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897397>

### Question 884

Predict the pKa unit of the indicated proton within +/- 1 pKa unit.

- 5
- 19
- 24
- 11

Answer: <https://biology-forums.com/index.php?topic=1899147>

### Question 885

What sequence of reagents is needed to convert benzyl bromide into 1-phenyl-2-octanol?

Answer: <https://biology-forums.com/index.php?topic=1898371>

### Question 886

Use the Hammond Postulate to explain why free radical brominations are more selective than free radical chlorinations.

Answer: <https://biology-forums.com/index.php?topic=1897584>

### Question 887

What two organic compounds result when 3-heptyne is heated in basic aqueous KMnO<sub>4</sub>?

Answer: <https://biology-forums.com/index.php?topic=1898284>

### Question 888

The conversion of butanoic acid to 2-pentanone is best accomplished with \_\_\_\_\_.

- 1. thionyl chloride; 2. methanol.
- methyllithium.
- 1. thionyl chloride; 2. methylmagnesium bromide.
- 1. methanol, sulfuric acid; 2. methyllithium.
- 1. sulfuric acid; 2. methanol.

Answer: <https://biology-forums.com/index.php?topic=1898948>

### Question 889

The cyclic structure of glucose is shown below. What functional groups are present in this molecule?

- acetal
- hydrate
- oxime
- hemiacetal

Answer: <https://biology-forums.com/index.php?topic=1898725>

### Question 890

Draw an acceptable structure for 6-ethyl-2,6,7-trimethyl-5-propylnonane.

Answer: <https://biology-forums.com/index.php?topic=1897370>

### Question 891

Show the complete saponification of tristearin, including the reagents needed and the products of the reaction.

Answer: <https://biology-forums.com/index.php?topic=1900135>

### Question 892

Provide the structure of 4-isopropylbenzaldehyde.

Answer: <https://biology-forums.com/index.php?topic=1899815>

### Question 893

Circle all substituents that would be expected to occupy an axial position in the fused bicyclic structure below.

Answer: <https://biology-forums.com/index.php?topic=1897466>

### Question 894

p-Methoxybenzaldehyde can be prepared from anisole using the Gatterman-Koch formylation. What mixture of reagents is necessary for this process?

- CO<sub>2</sub>, HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>

- CO, HCl, AlCl<sub>3</sub>, CuCl
- CO<sub>2</sub>, SO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>
- CO<sub>2</sub>, HCl, AlCl<sub>3</sub>
- CO, SO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1898617>

### Question 895

The two most abundant isotopes of boron are <sup>10</sup>B and <sup>11</sup>B, with <sup>11</sup>B being about 4 times more abundant. In the mass spectrum of trimethylborate [(CH<sub>3</sub>O)<sub>3</sub>B], \_\_\_\_\_.

- the peaks at m/z 103 and m/z 104 have equivalent intensities
- the peak at m/z 103 has an intensity which is 1/4 the intensity of the peak at m/z 104
- the peak at m/z 103 has an intensity which is 4 times that of the m/z 104 peak
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899294>

### Question 896

How would one use a Gilman-based synthesis to accomplish the following transformation?  
pentanal (CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CHO) to heptan-3-ol

Answer: <https://biology-forums.com/index.php?topic=1898374>

### Question 897

Draw the structure of any hydrocarbon alkyne which contains 3 carbon atoms.

Answer: <https://biology-forums.com/index.php?topic=1897310>

### Question 898

How is the enzyme chymotrypsin used in peptide structure determination?

Answer: <https://biology-forums.com/index.php?topic=1900060>

### Question 899

The difference in energy between reactants and the transition state is known as \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897550>

### Question 900

A student measured the optical activity of an unknown sugar at two different concentrations. The results of his measurements are shown below. Given that the sample cell had a path length of 10.0 cm, calculate the specific rotation for the unknown sugar. (Hint: Consider each measurement of plane polarized light has a true reading and a "ghost" reading 180° from the true reading).

concentration observed rotation  
2.00 g sugar in 10.0 mL water +159.1°  
5.00 g sugar in 10.0 mL water +127.8°

- +25.6°
- +256°
- -105°
- -10.5°
- +79.5°

Answer: <https://biology-forums.com/index.php?topic=1897679>

### Question 901

What is the approximate chemical shift of an alkynyl carbon in <sup>13</sup>C NMR spectroscopy?

- 120 ppm
- 70 ppm
- 200 ppm
- 10 ppm
- 30 ppm

Answer: <https://biology-forums.com/index.php?topic=1899362>

### Question 902

What general classification is given to the molecule below?

- primary chloride
- secondary chloride
- tertiary chloride
- vinyl chloride

• benzyl chloride

Answer: <https://biology-forums.com/index.php?topic=1897751>

### Question 903

Conversion of aldehydes and ketones to imines is an acid-catalyzed process. Explain why this conversion is actually hindered by the presence of too much acid.

Answer: <https://biology-forums.com/index.php?topic=1898703>

### Question 904

How many secondary (2°) carbons are found in 5-ethyl-3,3,4-trimethylheptane?

- 6
- 1
- 3
- 4
- 2

Answer: <https://biology-forums.com/index.php?topic=1897349>

### Question 905

Draw and name the six alkenes which have the molecular formula C<sub>5</sub>H<sub>10</sub>.

Answer: <https://biology-forums.com/index.php?topic=1897923>

### Question 906

Among the compounds water, but-1-yne, but-2-yne, and ethane, which are stronger acids than ammonia?

- water and but-1-yne
- but-1-yne and ethane
- water and ethane
- but-1-yne and but-2-yne

Answer: <https://biology-forums.com/index.php?topic=1898217>

### Question 907

What is the resonance energy of a system?

Answer: <https://biology-forums.com/index.php?topic=1899601>

### Question 908

In the mass spectrum of compounds with one nitrogen \_\_\_\_\_.

- most fragments are even and the molecular ion is odd
- most fragments are odd and the molecular ion is even
- most fragments are even and the molecular ion is even
- most fragments are odd and the molecular ion is odd

Answer: <https://biology-forums.com/index.php?topic=1898785>

### Question 909

The prostaglandin precursor arachidonic acid has the molecular formula C<sub>20</sub>H<sub>32</sub>O<sub>2</sub>. Given that arachidonic acid is an acyclic carboxylic acid that contains no carbon-carbon triple bonds, how many carbon-carbon double bonds are present?

- 2
- 3
- 4
- 5
- 6

Answer: <https://biology-forums.com/index.php?topic=1897904>

### Question 910

Provide a structural representation of oxetane.

Answer: <https://biology-forums.com/index.php?topic=1899496>

### Question 911

Ethyne (HCCH) does not show IR absorption in the region 2000-2500 cm<sup>-1</sup> because \_\_\_\_\_.

- C—C stretches occur at about 1640 cm<sup>-1</sup>
- C—H stretches occur at lower energies

- there is no change in the dipole moment when the CC bond in ethyne stretches
- there is a change in the dipole moment when the CC bond in ethyne stretches

Answer: <https://biology-forums.com/index.php?topic=1899227>

### Question 912

Explain why the lowest energy conformation of decane is an extended, or zig-zag conformation.

Answer: <https://biology-forums.com/index.php?topic=1897396>

### Question 913

Explain the regioselectivity observed in the radical addition of HBr to 2-methylpropene.

Answer: <https://biology-forums.com/index.php?topic=1898038>

### Question 914

How many methyl groups are present in 2,4-dimethylhexane?

- 4
- 0
- 6
- 8
- 2

Answer: <https://biology-forums.com/index.php?topic=1897378>

### Question 915

Is cholesterol an example of a simple lipid or a complex lipid? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1900089>

### Question 916

Which of the following alkenes has the largest molar heat of hydrogenation (ie, releases the most heat upon hydrogenation)?

- cis-2-butene
- trans-2-butene
- 2,3-dimethyl-2-butene
- 2-methyl-2-butene
- 1-hexene

Answer: <https://biology-forums.com/index.php?topic=1897949>

### Question 917

Which of the following is a vicinal dihalide?

- 1,3-dibromoheptane
- 3,3-dichloropentane
- isobutyl chloride
- trans-1,4-diiodocyclohexane
- cis-1,2-dibromocyclopentane

Answer: <https://biology-forums.com/index.php?topic=1897761>

### Question 918

Name the product which results when  $\text{CH}_3\text{CClLi}$  reacts with  $\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$  followed by addition of water.

Answer: <https://biology-forums.com/index.php?topic=1898238>

### Question 919

Draw the most stable conformation of cis-1,4-dipropylcyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897456>

### Question 920

Draw an acceptable structure for hex-2-yne.

Answer: <https://biology-forums.com/index.php?topic=1898143>

### Question 921

When 1 mole of anhydrous HCl is reacted with excess 1,3-pentadiene, both the 1,2 and the 1,4-addition products are formed. Which of the following structures shown below is the least likely to be one of these products? (Note: When a chiral carbon is formed in this reaction a racemic mixture results,

only one of the two possible enantiomers is shown.)

- 
- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1899619>

### Question 922

2-Methylhexane shows an intense peak in the mass spectrum at  $m/z = 43$ . Propose a likely structure for this fragment.

Answer: <https://biology-forums.com/index.php?topic=1899307>

### Question 923

What compound is formed when 2,2-dimethyloxirane is treated with ethanol containing a trace of HCl?

- 1-ethoxy-2-butanol
- 2-ethoxy-1-butanol
- 2-ethoxy-2-methyl-2-propanol
- 1-ethoxy-2-methyl-2-propanol
- 2-ethoxy-2-methyl-1-propanol

Answer: <https://biology-forums.com/index.php?topic=1899573>

### Question 924

Carboxylic acids boil at considerably higher temperatures than do alcohols, ketones, or aldehydes of similar molecular weights. This is because they \_\_\_\_\_.

- form stable hydrogen-bonded dimers
- are hydrophobic
- have a greater oxygen content
- are more acidic
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898871>

### Question 925

Draw the form of L-lysine which is present at biological pH, pH = 7.4.

Answer: <https://biology-forums.com/index.php?topic=1899988>

### Question 926

If the pI of amino acids with alkyl group side chains is 6.0, the pI of aspartic acid is \_\_\_\_\_.

- smaller than 6.0
- less than 0.0
- larger than 6.0
- equal to 6.0

Answer: <https://biology-forums.com/index.php?topic=1900008>

### Question 927

In an IR spectrometer, the \_\_\_\_\_ uses prisms or diffraction gratings to allow only one frequency of light to enter the detector at a time.

Answer: <https://biology-forums.com/index.php?topic=1899228>

### Question 928

In glutaric acid ( $\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ ),  $\text{pK}_{a1}$  is 4.35 while the  $\text{pK}_{a2}$  is 5.42. Why is the second carboxylic acid less acidic?

Answer: <https://biology-forums.com/index.php?topic=1898883>

### Question 929

Label the different  $^1\text{H}$  environments in the structure below a, b, c.... Then complete the table for each different type of proton. The first one is done for you as an example. (Note: there may be fewer than 7 different proton environments)

environments a b c d e f g chemical shift

(+/- 0.5 ppm) 1.9 spin-spin splittings

Answer: <https://biology-forums.com/index.php?topic=1899352>

### Question 930

When a 1° amine reacts with an alkyl sulfonyl chloride, the major organic product is \_\_\_\_\_.

- a sulfonamide
- a sulfoxide
- a nitrile
- an oxime
- a tosylhydrazone

Answer: <https://biology-forums.com/index.php?topic=1898815>

### Question 931

What reagents are needed to complete the following synthesis?

- 1) warm conc.  $\text{KMnO}_4$  /  $\text{NaOH}$ , 2)  $\text{HCl}$  (aq)
- 1)  $\text{Ag}(\text{NH}_3)_2\text{OH}$ , 2)  $\text{HCl}$  (aq)
- 1)  $\text{NaOH}$  / heat, 2)  $\text{HCl}$  (aq)
- 1)  $\text{NaOH}$  /  $\text{I}_2$ , 2)  $\text{HCl}$  (aq)

Answer: <https://biology-forums.com/index.php?topic=1899119>

### Question 932

Which of the following are strongly hydrogen bonded in the liquid phase?

- acid chlorides
- tertiary amides
- esters
- secondary amides
- nitriles

Answer: <https://biology-forums.com/index.php?topic=1898991>

### Question 933

What compound is produced when (R)-pentan-2-ol is treated with  $\text{TsCl}$  followed by  $\text{NaI}$ ?

- (S)-2-iodopentane
- sodium (R)-pent-3-oxide
- sodium (S)-pent-2-oxide
- (R)-2-iodopentane
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898452>

### Question 934

Provide the structure of atactic polypropylene.

Answer: <https://biology-forums.com/index.php?topic=1900258>

### Question 935

What type of compound results from the reaction of an acid chloride and a 2° amine?

- nitrile
- ester
- carboxylate
- 1° amine
- amide

Answer: <https://biology-forums.com/index.php?topic=1899058>

### Question 936

Which of the following compounds will undergo an  $\text{S}_{\text{N}}2$  reaction most readily?

- $(\text{CH}_3)_3\text{CCH}_2\text{I}$
- $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{CH}_2\text{Cl}$
- $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{CH}_2\text{I}$
- $(\text{CH}_3)_2\text{CHI}$
- $(\text{CH}_3)_3\text{CCI}$

Answer: <https://biology-forums.com/index.php?topic=1897799>

### Question 937

Explain why the pKa of acetylene is 25, while that of ethene is 44.

HCCHvsH<sub>2</sub>CCH<sub>2</sub>acetyleneethene

Answer: <https://biology-forums.com/index.php?topic=1897338>

### Question 938

A terpene is believed to have one of the structures below. Based on the isoprene rule, which structure is more likely. Explain your reasoning.  
or

Answer: <https://biology-forums.com/index.php?topic=1900206>

### Question 939

Draw the alkene product which results when 1-bromopentane is heated in acetone containing NaOH. Give a detailed, step-by-step mechanism for the production of this compound.

Answer: <https://biology-forums.com/index.php?topic=1897991>

### Question 940

Which of the following terms best describes the compound below?

- an alkaloid
- a component of most lipid bilayers
- a phospholipid
- a cationic detergent
- a hard-water scum

Answer: <https://biology-forums.com/index.php?topic=1900159>

### Question 941

Provide the structure of the carbene that results when diazomethane (shown below) decomposes.

Answer: <https://biology-forums.com/index.php?topic=1897594>

### Question 942

Provide the structure of the predominant form of glutamine present in an aqueous solution at a pH of 12.0.

Answer: <https://biology-forums.com/index.php?topic=1899995>

### Question 943

An unknown alkyne with a molecular formula of C<sub>7</sub>H<sub>12</sub> give the following products upon ozonolysis. What is the structure of the starting material?

- (CH<sub>3</sub>)<sub>2</sub>CHCCCH<sub>2</sub>(CH<sub>3</sub>)<sub>2</sub>
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CCCH<sub>2</sub>CH<sub>3</sub>
- (CH<sub>3</sub>)<sub>2</sub>CHCCCH<sub>2</sub>CH<sub>3</sub>
- CH<sub>3</sub>CH<sub>2</sub>CCCH<sub>2</sub>CH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1898291>

### Question 944

Which of the following alkyl halides yields the most stable carbocation intermediate during solvolysis in hot ethanol?

- (S)-3-bromopent-1-ene
- (S)-2-bromopentane
- methyl iodide
- (R)-2-bromopentane
- 1-chlorobutane

Answer: <https://biology-forums.com/index.php?topic=1899609>

### Question 945

The Arrhenius equation mathematically models which of the following statements?

- The rate of a chemical reaction increases exponentially with increasing concentration of reactants.
- The rate of a chemical reaction is directly related to the E<sub>a</sub> and that increasing the temperature will alter the E<sub>a</sub> for that reaction.
- Increasing the temperature of a chemical reaction increases the number of particles in the reaction that have the minimum energy required to meet the E<sub>a</sub>.
- The rate of a chemical reaction is exponentially related to the E<sub>a</sub> and relatively small differences in the E<sub>a</sub> can dramatically affect the reaction rates of similar reactions at the same temperature.
- both C and D

Answer: <https://biology-forums.com/index.php?topic=1897541>



### Question 946

Circle all structures shown below that are chiral.

Answer: <https://biology-forums.com/index.php?topic=1897641>

### Question 947

Provide the IUPAC name of  $(\text{CH}_3)_3\text{CCH}_2\text{CH}_2\text{NHCH}_2\text{CH}_3$ .

Answer: <https://biology-forums.com/index.php?topic=1898742>

### Question 948

View a butane molecule along the C2—C3 bond and provide a Newman projection of the lowest energy conformer.

Answer: <https://biology-forums.com/index.php?topic=1897422>

### Question 949

Which of the following types of hydrocarbons is(are) saturated?

- alkenes
- aromatics
- alkynes
- alkanes
- All of the above are saturated.

Answer: <https://biology-forums.com/index.php?topic=1897340>

### Question 950

Provide the structure of cyclohexanecarbaldehyde.

Answer: <https://biology-forums.com/index.php?topic=1898627>

### Question 951

Which of the following terms comes closest to describing an electrophile?

- Lewis base
- anion
- Lewis acid
- nucleophile
- nonpolar

Answer: <https://biology-forums.com/index.php?topic=1897148>

### Question 952

Chlorination of methane can result in a mixture of chlorinated products. What experimental conditions should be used to favor the production of chloromethane over the other chlorinated products?

Answer: <https://biology-forums.com/index.php?topic=1897491>

### Question 953

Which of the following compounds will undergo bromination least rapidly when treated with  $\text{Br}_2$  and  $\text{FeBr}_3$ ?

- p-methylacetanilide
- benzene
- bromobenzene
- acetanilide
- benzenesulfonic acid

Answer: <https://biology-forums.com/index.php?topic=1898559>

### Question 954

Which of the following peaks would one expect to observe as a major, strong peak in the IR spectrum of a lipid wax?

- 2200  $\text{cm}^{-1}$
- 2710  $\text{cm}^{-1}$
- 1730  $\text{cm}^{-1}$
- 1620  $\text{cm}^{-1}$
- 3200-3500  $\text{cm}^{-1}$

Answer: <https://biology-forums.com/index.php?topic=1900096>

### Question 955

Which of the following compounds will not undergo reaction with an enolate?

- bromine
- propanal
- 1-bromobutane
- 1-pentene
- benzoyl chloride

Answer: <https://biology-forums.com/index.php?topic=1899080>

### Question 956

Which series of reactions described below, if any, will result in the formation of 2-methylpentan-3-one starting with 1-propanol?

- 1.(CH<sub>3</sub>)<sub>2</sub>CHMgBr/ diethyl ether2.dilute H<sub>3</sub>O+3.PCC
- 1.PCC2.(CH<sub>3</sub>)<sub>2</sub>CHLi/ diethyl ether3.dilute H<sub>3</sub>O+4.Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/H<sub>2</sub>SO<sub>4</sub> and heat
- 1.Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/H<sub>2</sub>SO<sub>4</sub> and heat2.SOCI<sub>2</sub>3.2 (CH<sub>3</sub>)<sub>2</sub>CHMgBr/ diethyl ether4.H<sub>3</sub>O+
- 1.Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/H<sub>2</sub>SO<sub>4</sub> and heat2.(CH<sub>3</sub>)<sub>2</sub>CHMgBr/ diethyl ether3.dilute H<sub>3</sub>O+4.LiAlH<sub>4</sub>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898675>

### Question 957

Draw the structure of (2R,3R)-2,3-dibromo-3-chloropentane.

Answer: <https://biology-forums.com/index.php?topic=1897651>

### Question 958

A mixture of equal amounts of two enantiomers \_\_\_\_\_.

- is called a racemic mixture
- is optically inactive
- implies that the enantiomers are meso forms
- both A and B
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897681>

### Question 959

Which of the following represents a carbonate ester?

- RNHCO<sub>2</sub>R'
- RCOR'
- RCO<sub>2</sub>R'
- ROCO<sub>2</sub>R'
- (RO)<sub>3</sub>CR'

Answer: <https://biology-forums.com/index.php?topic=1900303>

### Question 960

Provide the sequence of synthetic steps required to produce N-cyclohexyl-2-bromopropanamide from propanoic acid.

Answer: <https://biology-forums.com/index.php?topic=1899124>

### Question 961

The relative reactivity of the 1°: 2°: 3° hydrogens of (CH<sub>3</sub>)<sub>3</sub>CCH<sub>2</sub>CH<sub>3</sub> in free radical chlorination is 1: 3.8: 5.0. Provide the structure of each monochlorination product, and estimate the relative amount of each in the mixture of monochlorinated products.

Answer: <https://biology-forums.com/index.php?topic=1897580>

### Question 962

Circle the coplanar atoms in 1-ethylcyclopentene shown below.

Answer: <https://biology-forums.com/index.php?topic=1897247>

### Question 963

Explain why S<sub>N</sub>2 reactions on allyl bromide proceed faster than corresponding reactions on ethyl bromide.

Answer: <https://biology-forums.com/index.php?topic=1899647>

### Question 964

The reaction of  $\text{CH}_3\text{CH}_2\text{MgBr}$  with  $\text{CH}_3\text{COCH}_2\text{CH}_3$  gives \_\_\_\_\_.

- the racemate of a chiral product
- a single enantiomer
- a mixture of diastereomers
- an achiral product
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898368>

### Question 965

The major product from the reaction of 2-chloro-2-methylpentane with sodium ethoxide in ethanol results from which of the following mechanistic pathways?

- $\text{S}_\text{N}2$
- $\text{S}_\text{N}1$
- $\text{E}_2$
- $\text{E}_{\text{cb}}$
- $\text{E}_1$

Answer: <https://biology-forums.com/index.php?topic=1897876>

### Question 966

Provide a detailed, stepwise mechanism for the Strecker synthesis of racemic alanine from acetaldehyde.

Answer: <https://biology-forums.com/index.php?topic=1900029>

### Question 967

The electronegativity of elements on the periodic table increases going \_\_\_\_\_ a column and to the \_\_\_\_\_ in each row.

- down; left
- up; right
- down; right
- up; left

Answer: <https://biology-forums.com/index.php?topic=1897105>

### Question 968

Consider molecules with the formula  $\text{C}_{10}\text{H}_{16}$ . Which of the following structural features are not possible within this set of molecules?

- 2 rings and 1 double bond
- 1 ring and 1 triple bond
- 2 triple bonds
- 3 double bonds
- 2 double bonds and 1 ring

Answer: <https://biology-forums.com/index.php?topic=1897896>

### Question 969

Which is the more stable diene shown below? Briefly explain your answer.

Answer: <https://biology-forums.com/index.php?topic=1897963>

### Question 970

Which sequence correctly ranks the following aromatic rings in order of increasing rate of reactivity in an electrophilic aromatic substitution reaction?

- $1 < 2 < 3$
- $2 < 1 < 3$
- $2 < 3 < 1$
- $3 < 1 < 2$

Answer: <https://biology-forums.com/index.php?topic=1898550>

### Question 971

If possible, draw the structure of any diastereomer of the molecule shown below.

Answer: <https://biology-forums.com/index.php?topic=1897703>

### Question 972

Arrange the following fatty acids in order of increasing melting point:  
stearic acid, linolenic, linoleic, and oleic.

Answer: <https://biology-forums.com/index.php?topic=1900146>

### Question 973

Show how a monosaccharide such as glucose can attach to a protein structure through the formation of an O-linked glycosidic bond with Ser. (Hint: This structure would be properly called an acetal.)

Answer: <https://biology-forums.com/index.php?topic=1900079>

### Question 974

Describe how electrophoresis works.

Answer: <https://biology-forums.com/index.php?topic=1900014>

### Question 975

In the lowest energy chair conformation of cis-1,3-dimethylcyclohexane, how many axial positions are occupied by hydrogen atoms?

- 2
- 6
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1897447>

### Question 976

Name the haloalkane shown. Be sure to include the appropriate R or S description if needed.

Answer: <https://biology-forums.com/index.php?topic=1897770>

### Question 977

Disregarding stereoisomers, how many different enols can phenylacetone form?

- 0
- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1899087>

### Question 978

Explain how a mixture of phenol and cyclopentanol might be separated using differences in their solubility properties.

Answer: <https://biology-forums.com/index.php?topic=1898340>

### Question 979

Use the following three structures to answer the two questions below.

The relationship between I and III is: \_\_\_\_\_.

- enantiomers
- constitutional isomers
- same compound
- diastereomers

Answer: <https://biology-forums.com/index.php?topic=1897712>

### Question 980

Which of the following elements is necessary for the vulcanization of rubber?

- phosphorus
- boron
- sulfur
- silicon
- titanium

Answer: <https://biology-forums.com/index.php?topic=1900274>

### Question 981

Species with unpaired electrons are called \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897483>

### Question 982

Give the IUPAC name for the cycloalkane shown below.

Answer: <https://biology-forums.com/index.php?topic=1897429>

### Question 983

Which of the following best describes the molecules of a sample of ethane gas at room temperature?

- Almost all of the molecules are frozen or locked in the eclipsed conformation.
- The molecules are rapidly interconverting between the eclipsed and staggered conformations, but at any one time slightly more of them are present in the eclipsed conformation.
- The molecules are rapidly interconverting between the eclipsed and staggered conformations, but at any one time slightly more of them are present in the staggered conformation.
- Almost all of the molecules are frozen or locked in the staggered conformation.

Answer: <https://biology-forums.com/index.php?topic=1897408>

### Question 984

Why is chain branching less common in anionic polymerization than in cationic polymerization?

Answer: <https://biology-forums.com/index.php?topic=1900252>

### Question 985

The following compound was found to inhibit HIV-1 (J. Med. Chem. 2011, 1812). Predict the structure of the hydrolysis product.

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1899125>

### Question 986

By what mechanism does cyclohexanol react when treated in sulfuric acid and what compound results?

- E1; methoxycyclohexane
- E1; cyclohexene
- SN1; methoxycyclohexane
- E2; methoxycyclohexane
- E2; cyclohexene

Answer: <https://biology-forums.com/index.php?topic=1898005>

### Question 987

What are the predicted  $m/z$  values (masses) and relative heights of all the molecular ions of 1-bromoethane that would appear on a mass spectrum (excluding peaks produced by  $^{13}\text{C}$  and  $^2\text{H}$ )?

- M+ peak at  $m/z = 79$  and an M+1 peak at  $m/z = 81$   
The M+1 peak is approximately 1/2 the height of the M+ peak.
- M+ peak at  $m/z = 79$  and an M+1 peak at  $m/z = 81$   
The M+1 peak is approximately the same height as the M+ peak.
- M+ peak at  $m/z = 108$  and an M+1 peak at  $m/z = 110$   
The M+1 peak is approximately 1/2 the height of the M+ peak.
- M+ peak at  $m/z = 108$  and an M+2 peak at  $m/z = 110$   
M+2 peak is approximately 1/2 the height of the M+ peak.
- M+ peak at  $m/z = 108$  and an M+2 peak at  $m/z = 110$   
The M+2 peak is approximately the same height as the M+ peak.

Answer: <https://biology-forums.com/index.php?topic=1899295>

### Question 988

The natural abundances of chlorine's two major isotopes are  $^{35}\text{Cl}$  (75.5%) and  $^{37}\text{Cl}$  (24.5%). If the mass spectrum of chlorobenzene contains a peak at  $m/z$  114 with an abundance of 15.0%, calculate the percent abundance of the peak at  $m/z$  112.

Answer: <https://biology-forums.com/index.php?topic=1899302>

### Question 989

Which halide is a better nucleophile, iodide or fluoride? Explain.

Answer: <https://biology-forums.com/index.php?topic=1897793>

### Question 990

Absorption of what type of electromagnetic radiation results in ionization?

- X-rays
- radio waves
- microwaves
- ultraviolet light
- infrared light

Answer: <https://biology-forums.com/index.php?topic=1899199>

### Question 991

Which of the following oils would consume the greatest number of equivalents of hydrogen when subject to catalytic hydrogenation?

- olive oil
- canola oil
- corn oil
- linseed oil

Answer: <https://biology-forums.com/index.php?topic=1900126>

### Question 992

Which of the following carbocations is likely to undergo a hydride shift?

- I
- II
- III
- IV
- II and IV
- II and III

Answer: <https://biology-forums.com/index.php?topic=1897880>

### Question 993

Devise an efficient method for preparing 1-pentanamine from 1-chloropentane.

Answer: <https://biology-forums.com/index.php?topic=1898844>

### Question 994

Which of the following alkenes is the major product when 2-bromo-2-methylpentane is treated with potassium tert-butoxide in tert-butanol?

- (E)-4-methylpent-2-ene
- 4-methylpent-1-ene
- 2-methylpent-2-ene
- (Z)-4-methylpent-2-ene
- 2-methylpent-1-ene

Answer: <https://biology-forums.com/index.php?topic=1897975>

### Question 995

\_\_\_\_\_ is the major intermolecular attraction responsible for the relatively high boiling points of alcohols.

Answer: <https://biology-forums.com/index.php?topic=1898323>

### Question 996

Cross-linking typically \_\_\_\_\_ the  $T_m$  of a polymer.

Answer: <https://biology-forums.com/index.php?topic=1900326>

### Question 997

Provide the structure of o-bromobenzoyl chloride.

Answer: <https://biology-forums.com/index.php?topic=1898971>

### Question 998

When L-erythrose is treated with NaBH<sub>4</sub>, \_\_\_\_\_.

- a meso alditol is produced
- an optically active alditol is produced
- a 70:30 mixture of enantiomeric alditols results
- a 50:50 mixture of enantiomeric alditols results
- the product mixture contains two diastereomeric alditols

Answer: <https://biology-forums.com/index.php?topic=1899893>

### Question 999

What IR absorption is characteristic of the O-H stretch in alcohols?

- 4000 cm<sup>-1</sup>
- 1710 cm<sup>-1</sup>
- 3300 cm<sup>-1</sup>
- 2950 cm<sup>-1</sup>
- 2250 cm<sup>-1</sup>

Answer: <https://biology-forums.com/index.php?topic=1899246>

### Question 1000

The following reaction occurs readily:

Experimentally one finds that if the concentration of I<sup>-</sup> is doubled, the rate doubles. Also if the concentration of CH<sub>3</sub>Br is halved, the rate is halved. What is the rate equation for this reaction?

Answer: <https://biology-forums.com/index.php?topic=1897539>

### Question 1001

Which compound has an IR absorption with a broad peak and a single spike at 3300 cm<sup>-1</sup>?

- CH<sub>3</sub>CH<sub>2</sub>CN
- CH<sub>3</sub>CH=CHCH<sub>3</sub>
- (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>O
- (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>NH
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH

Answer: <https://biology-forums.com/index.php?topic=1899244>

### Question 1002

Which of the following fragment peaks would not be present in the mass spectrum of n-hexane?

- 43
- 87
- 71
- 29
- 57

Answer: <https://biology-forums.com/index.php?topic=1899306>

### Question 1003

In electrophilic aromatic substitution reactions, a -NHCOCH<sub>3</sub> substituent on the aromatic ring is \_\_\_\_\_.

- an activator and an o,p-director
- a deactivator and an o,p-director
- a deactivator and a m-director
- an activator and a m-director
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898542>

### Question 1004

Does the molecule shown below contain asymmetric carbon atoms? Is this molecule chiral?

Answer: <https://biology-forums.com/index.php?topic=1897646>

### Question 1005

Which of the following statements correctly describe(s) the relationship between the structure of a fatty acid and its melting point?

- As the number of double bonds in a fatty acid increases, its melting point decreases.
- The presence of a trans double bond in the fatty acid has a greater effect on its melting point than does the presence of a cis double bond.
- Saturated fatty acids have melting points that increase gradually with their molecular weights.
- both A and C
- A, B, and C

Answer: <https://biology-forums.com/index.php?topic=1900120>

### Question 1006

Which of the following reactions or series of reactions would reduce 3-methylbutan-2-ol into 2-methylbutane?

- 1. pyridinium chlorochromate
- 2. ZnCl<sub>2</sub>/HCl
- 1. ZnCl<sub>2</sub>/HCl
- 2. t-butoxide/t-butanol
- 1. TsCl/pyridine
- 2. conc. KMnO<sub>4</sub>
- 1. NaOCH<sub>3</sub>
- 2.. H<sub>2</sub>SO<sub>4</sub>/heat
- 1. TsCl/pyridine
- 2. LiAlH<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1898462>

### Question 1007

Which of the following amino acids are classified as essential amino acids?

(More than one answer is possible.)

- isoleucine
- histidine
- tryptophan
- proline

Answer: <https://biology-forums.com/index.php?topic=1899982>

### Question 1008

Carbonated beverages typically have pHs below 7.0. What acid is present which lowers the pH? Show the reaction by which it is formed.

Answer: <https://biology-forums.com/index.php?topic=1899072>

### Question 1009

The rate of a reaction typically increases as the temperature increases because \_\_\_\_\_.

- the activation energy decreases
- the A term in the Arrhenius equation increases
- the fraction of molecules with kinetic energy greater than E<sub>a</sub> increases
- the activation energy increases
- the molecules make more collisions with the wall of the reaction vessel

Answer: <https://biology-forums.com/index.php?topic=1897551>

### Question 1010

Di-n-pentyl ether can be converted to 1-bromopentane by treatment with HBr through essentially a(n) \_\_\_\_\_ mechanism.

- E2
- SN2
- SN1
- E1
- ring opening

Answer: <https://biology-forums.com/index.php?topic=1899537>

### Question 1011

Which of the following amines can be resolved into enantiomers?

- trimethylamine
- 2-pentanamine
- 4-(dimethylamino) pyridine
- dimethylammonium chloride
- 3-pentanamine

Answer: <https://biology-forums.com/index.php?topic=1898760>



### Question 1012

Provide the name of the major organic product that results when 1-pentene is subjected to hydroboration/oxidation.

Answer: <https://biology-forums.com/index.php?topic=1898346>

### Question 1013

Which H atom in the molecule shown will be most readily abstracted by a bromine radical?

- Ha
- Hb
- Hc
- Hd
- He

Answer: <https://biology-forums.com/index.php?topic=1897573>

### Question 1014

Show how branching could occur during the free-radical polymerization of styrene.

Answer: <https://biology-forums.com/index.php?topic=1900245>

### Question 1015

Why is the acid-catalyzed halogenation of ketones generally preferred over the base-promoted halogenation?

Answer: <https://biology-forums.com/index.php?topic=1899116>

### Question 1016

Which of the statements below correctly describes the chair conformations of

- The two chair conformations are equal in energy.
- The lower energy chair conformation contains two axial ethyl groups.
- The lower energy chair conformation contains two equatorial ethyl groups.
- The higher energy chair conformation contains two equatorial ethyl groups.
- The higher energy chair conformation contains two axial ethyl groups.

Answer: <https://biology-forums.com/index.php?topic=1897450>

### Question 1017

Addition of Br<sub>2</sub> to (E)-hex-3-ene produces \_\_\_\_\_.

- (E)-3,4-dibromo-3-hexene
- a mixture of enantiomeric dibromides which is optically inactive
- a mixture of enantiomeric dibromides which is optically active
- a meso dibromide
- (Z)-3,4-dibromo-3-hexene

Answer: <https://biology-forums.com/index.php?topic=1898085>

### Question 1018

When compound X is heated, PhCOCH(CH<sub>3</sub>)<sub>2</sub> and CO<sub>2</sub> are produced. Offer a structure for compound X.

Answer: <https://biology-forums.com/index.php?topic=1899174>

### Question 1019

Explain the relative acidities of cyclohexene (pK<sub>a</sub> of 46) and cyclopentadiene (pK<sub>a</sub> of 16).

Answer: <https://biology-forums.com/index.php?topic=1899743>

### Question 1020

In biological systems, sulfonium salts such as SAM serve what function?

- crown ether agents
- esterifying agents
- alkylating agents
- nucleophilic agents
- epoxidizing agents

Answer: <https://biology-forums.com/index.php?topic=1899548>

### Question 1021

When the free radical halogenation of methylpropane is done with chlorine, the major product is 1-chloro-2-methylpropane, but if bromine is used, the major product is 2-bromo-2-methylpropane. Explain the difference in the regiochemistry of these reactions.

Answer: <https://biology-forums.com/index.php?topic=1897578>

### Question 1022

Provide the line-angle formula for the alcohol  $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)_2$ .

Answer: <https://biology-forums.com/index.php?topic=1897198>

### Question 1023

Which one of the molecules shown below has no net molecular dipole moment?

- $\text{H}_2\text{CCH}_2$
- $\text{CH}_3\text{Cl}$
- $\text{CH}_2\text{O}$
- $\text{CH}_3\text{OH}$
- $\text{CH}_2\text{Cl}_2$

Answer: <https://biology-forums.com/index.php?topic=1897287>

### Question 1024

Oxidation of a  $2^\circ$  alcohol with chromic acid results in the production of \_\_\_\_\_.

- an aldehyde
- a ketone
- an ether
- an ester
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898661>

### Question 1025

In the mass spectrum of 3,3-dimethyl-2-butanone, the base peak will occur at  $m/z$  \_\_\_\_\_.

- 84
- 43
- 58
- 100
- 85

Answer: <https://biology-forums.com/index.php?topic=1898648>

### Question 1026

Draw the products which result when oct-3-yne is heated in basic potassium permanganate solution.

Answer: <https://biology-forums.com/index.php?topic=1898287>

### Question 1027

When ethers are stored in the presence of oxygen, what explosive materials can result from autoxidation of the ether?

Answer: <https://biology-forums.com/index.php?topic=1899542>

### Question 1028

Peptide bonds are \_\_\_\_\_.

- imido linkages
- amide linkages
- disulfide linkages
- ester linkages
- ether linkages

Answer: <https://biology-forums.com/index.php?topic=1899961>

### Question 1029

Which line angle drawing best represents the Newman Projection shown below?

- 
- 
- 
-

Answer: <https://biology-forums.com/index.php?topic=1897420>

### Question 1030

Which of the following compounds has the lowest boiling point?

- 1,2,3-trichlorobenzene
- m-dichlorobenzene
- o-dichlorobenzene
- p-dichlorobenzene
- 1,2,4-trichlorobenzene

Answer: <https://biology-forums.com/index.php?topic=1899820>

### Question 1031

Which of the following is the strongest acid?

- chloroacetic acid
- bromoacetic acid
- acetic acid
- fluoroacetic acid

Answer: <https://biology-forums.com/index.php?topic=1898878>

### Question 1032

The atomic number of boron is 5. The correct electronic configuration of boron is:

- 1s22s22p1
- 1s22s23s1
- 2s22p3
- 1s22p3
- 1s22s3

Answer: <https://biology-forums.com/index.php?topic=1897091>

### Question 1033

Provide the reagents necessary to convert (R)-3-methylpent-1-ene to

Answer: <https://biology-forums.com/index.php?topic=1898348>

### Question 1034

Provide the structure of the major organic products which result in the reaction below.

Answer: <https://biology-forums.com/index.php?topic=1897832>

### Question 1035

Starting with any alkene, how could you make pimelic acid (HOOC(CH<sub>2</sub>)<sub>5</sub>COOH)?

Answer: <https://biology-forums.com/index.php?topic=1898904>

### Question 1036

Most of the principal sex hormones in humans are \_\_\_\_\_.

- terpenes
- phospholipids
- prostaglandins
- steroids
- triglycerides

Answer: <https://biology-forums.com/index.php?topic=1900184>

### Question 1037

What series of synthetic steps could be used to prepare PhCH(OH)CH<sub>2</sub>CH<sub>3</sub> from

PhCH<sub>2</sub>CH<sub>2</sub>OH

Answer: <https://biology-forums.com/index.php?topic=1898440>

### Question 1038

What is the practical limit on the use of carboxypeptidase in providing sequence information?

- three residues on the C-terminal end
- two residues on the C-terminal end

- two residues on the N-terminal end
- six residues on the N-terminal end
- three residues on the N-terminal end

Answer: <https://biology-forums.com/index.php?topic=1900063>

### Question 1039

Provide a detailed, stepwise mechanism for the base-catalyzed enolization of acetaldehyde.

Answer: <https://biology-forums.com/index.php?topic=1899084>

### Question 1040

D-Tagatose (below) is a naturally occurring sweetener that is 92% as sweet as sucrose but has only 38% of the calories. Which epimer of D-glucose undergoes keto-enol tautomerization to give D-tagatose?

Answer: <https://biology-forums.com/index.php?topic=1899922>

### Question 1041

Provide the structure of (R)-4-ethoxypentanenitrile.

Answer: <https://biology-forums.com/index.php?topic=1898970>

### Question 1042

Which of the following statements is/are true?

- $\text{LiAlH}[\text{OC}(\text{CH}_3)_3]_3$  reacts with acid chlorides to yield primary alcohols after hydrolysis.
- $\text{LiAlH}_4$  reacts with acid chlorides to yield secondary alcohols after hydrolysis.
- Two equivalents of Grignard reagent react with acid chlorides to yield tertiary alcohols after hydrolysis.
- both A and B
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1899038>

### Question 1043

Which compound would react most rapidly with sodium methoxide and heat?

- 2-chloropyridine
- 4-chloropyridine
- pyridine
- 3-chloropyridine

Answer: <https://biology-forums.com/index.php?topic=1898802>

### Question 1044

Pyridine does not undergo Friedel-Crafts reactions. Offer an explanation.

Answer: <https://biology-forums.com/index.php?topic=1898804>

### Question 1045

Show how 3-methylthiopropional may be converted to methionine.

Answer: <https://biology-forums.com/index.php?topic=1900023>

### Question 1046

When  $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{COCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$  is heated in the presence of an acid catalyst, a reaction occurs. This product has the formula  $\text{C}_9\text{H}_{16}\text{O}_2$ . Provide the structure of this product.

Answer: <https://biology-forums.com/index.php?topic=1898715>

### Question 1047

The IR spectrum of m-xylene contains stretches which are characteristic of most aromatic hydrocarbons. List the peaks (in  $\text{cm}^{-1}$ ) associated with the aromatic CC stretch and the aromatic C—H stretch.

Answer: <https://biology-forums.com/index.php?topic=1899830>

### Question 1048

Describe a sequence of reactions by which trans-pent-2-ene can be straightforwardly prepared from propyne.

Answer: <https://biology-forums.com/index.php?topic=1898250>

### Question 1049

Which of the following compounds has carbon in the highest oxidation state?

- CH<sub>3</sub>CH<sub>2</sub>OH
- CH<sub>3</sub>C(OCH<sub>2</sub>CH<sub>3</sub>)<sub>3</sub>
- CH<sub>3</sub>C(O)CH<sub>3</sub>
- CO<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1898419>

### Question 1050

Which of the following species is attacked by benzene in the electrophilic nitration reaction?

- HNO<sub>3</sub>
- NO<sup>+</sup>
- NO<sub>2</sub>
- NO<sub>2</sub><sup>+</sup>
- N<sup>3-</sup>

Answer: <https://biology-forums.com/index.php?topic=1898536>

### Question 1051

Which of the following alkynes has the lowest boiling point?

- 1-decyne
- 3-hexyne
- 2-heptyne
- 1-hexyne
- 3,3-dimethyl-1-butyne

Answer: <https://biology-forums.com/index.php?topic=1898208>

### Question 1052

Which orbital is the lone pair of each N in, sp<sup>2</sup> or p?

Answer: <https://biology-forums.com/index.php?topic=1899776>

### Question 1053

Describe the general molecular features which a nonionic detergent would possess.

Answer: <https://biology-forums.com/index.php?topic=1900169>

### Question 1054

The pK<sub>a1</sub> for oxalic acid (pK<sub>a</sub> = 1.27) is much lower than the pK<sub>a1</sub> of glutaric acid (pK<sub>a</sub> = 4.35). Briefly explain why.

Answer: <https://biology-forums.com/index.php?topic=1898885>

### Question 1055

Provide a series of synthetic steps by which 3-bromoethylbenzene can be prepared from benzene.

Answer: <https://biology-forums.com/index.php?topic=1898613>

### Question 1056

Arrange the following regions of the electromagnetic spectrum in order of increasing wavelength: X ray, radio, UV, and IR.

Answer: <https://biology-forums.com/index.php?topic=1899198>

### Question 1057

Starting with an acid chloride and any other chemical reagent you've learned in organic chemistry, which of the following functional groups can be synthesized in three steps or less?

- primary alcohol
- amine
- tertiary alcohol
- ester
- aldehyde
- only A and C
- only C, D and E
- all of the above (A - E)

Answer: <https://biology-forums.com/index.php?topic=1899036>

### Question 1058

Which of the following is an unsaturated fatty acid?

- palmitic acid
- stearic acid
- oxalic acid
- linoleic acid
- adipic acid

Answer: <https://biology-forums.com/index.php?topic=1900113>

### Question 1059

Which of the following amino acids has its isoelectric point at the lowest pH?

- aspartic acid
- arginine
- glycine
- methionine
- valine

Answer: <https://biology-forums.com/index.php?topic=1900011>

### Question 1060

Rank the following compounds in order of acidity.

Answer: <https://biology-forums.com/index.php?topic=1897337>

### Question 1061

\_\_\_\_\_ is the use of an optically active reagent or catalyst to convert an optically inactive starting material into an optically active product.

- Asymmetric induction
- Meso effect
- Optical reduction
- Chiralization
- Racemization

Answer: <https://biology-forums.com/index.php?topic=1898100>

### Question 1062

What IR absorption is characteristic of the terminal C-H stretch in terminal alkynes?

- 2400 cm<sup>-1</sup>
- 2250 cm<sup>-1</sup>
- 3500 cm<sup>-1</sup>
- 1710 cm<sup>-1</sup>
- 3300 cm<sup>-1</sup>

Answer: <https://biology-forums.com/index.php?topic=1899239>

### Question 1063

A novice chemist wished to prepare 1-methylcyclohexane-1,4-diol from the keto alcohol shown below by treating it with the appropriate Grignard reagent. Was the chemist successful? Explain.

Answer: <https://biology-forums.com/index.php?topic=1898392>

### Question 1064

What crossed-aldol product results when propanal is heated in the presence of excess 2,2-dimethylpropanal and sodium hydroxide?

Answer: <https://biology-forums.com/index.php?topic=1899141>

### Question 1065

Lasalocid A (shown below) is an antibacterial agent and a coccidiostat, which is produced by strains of *Streptomyces lasaliensis*. It is the drug in the feed additives. How many ether functional groups are present in Lasalocid A?

- 1
- 2
- 3

- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1899561>

### Question 1066

HBr can be added to an alkene in the presence of peroxides (ROOR). What function does the peroxide serve in this reaction?

- acid catalyst
- electrophile
- radical chain initiator
- nucleophile
- solvent

Answer: <https://biology-forums.com/index.php?topic=1898022>

### Question 1067

Predict the two most likely mechanisms that occur when iodocyclohexane is heated in methanol.

- E1 and E2
- SN1 and SN2
- SN2 and E2
- E1 and SN1

Answer: <https://biology-forums.com/index.php?topic=1897875>

### Question 1068

The following Diels-Alder reaction was featured in Tet. Lett. 2011, 960. Predict the structure of the starting materials.

Answer: <https://biology-forums.com/index.php?topic=1899683>

### Question 1069

Which has the smaller heat of hydrogenation, (E)-2-pentene or (Z)-2-pentene? What is the structural origin of this difference?

Answer: <https://biology-forums.com/index.php?topic=1897944>

### Question 1070

Reaction of ethylmagnesium bromide with which of the following compounds yields a tertiary alcohol after quenching with aqueous acid?

- CH<sub>3</sub>CHO
- H<sub>2</sub>CO
- ethylene oxide
- (CH<sub>3</sub>)<sub>2</sub>CO
- n-butyllithium

Answer: <https://biology-forums.com/index.php?topic=1898365>

### Question 1071

Which of the following best approximates the CCC bond angle of propene?

- 109°
- 150°
- 120°
- 180°
- 90°

Answer: <https://biology-forums.com/index.php?topic=1897889>

### Question 1072

Which of the following compounds absorbs the longest wavelength of UV-visible light?

- (Z)-but-2-ene
- hex-1-ene
- (Z)-1,3-hexadiene
- (E)-1,3,5-hexatriene
- (E)-but-2-ene

Answer: <https://biology-forums.com/index.php?topic=1899695>

### Question 1073

What term describes the structural relationship between cis-1,2-dimethylcyclopentane and trans-1,3-dimethylcyclopentane?

- constitutional isomers
- enantiomers
- conformers
- not isomers
- diastereomers

Answer: <https://biology-forums.com/index.php?topic=1897606>

### Question 1074

Provide the structure of sodium cyclopentadienide.

Answer: <https://biology-forums.com/index.php?topic=1899741>

### Question 1075

The energy difference between the allowed spin states for an  $^1\text{H}$  nucleus is \_\_\_\_\_ the strength of the external magnetic field in which it is placed.

- logarithmically related to
- inversely proportional to
- directly proportional to
- exponentially related to
- independent of

Answer: <https://biology-forums.com/index.php?topic=1899316>

### Question 1076

Draw the two major resonance structures of the acylium ion which results when butanoyl chloride is treated with  $\text{AlCl}_3$ .

Answer: <https://biology-forums.com/index.php?topic=1898588>

### Question 1077

Which of the following compounds contains a tertiary amine?

1) 2-methyl-2-propanamine 2) N-ethylpyrrolidine 3) N-methylcyclohexylamine 4) 2-(dimethylamino)butanal

- 1
- 4
- 3
- 1 and 3
- 2 and 4

Answer: <https://biology-forums.com/index.php?topic=1898763>

### Question 1078

Provide the structure of glutaric acid.

Answer: <https://biology-forums.com/index.php?topic=1898866>

### Question 1079

Cis-1,4-Polybutadiene is one form of synthetic rubber. Provide the structure of this polymer.

Answer: <https://biology-forums.com/index.php?topic=1900277>

### Question 1080

Dehydrohalogenation of an alkyl halide by treating it with a strong base to yield an alkene product typically occurs by what reaction mechanism?

- free radical
- $\text{S}_{\text{N}}1$
- $\text{S}_{\text{N}}2$
- $\text{E}1$
- $\text{E}2$

Answer: <https://biology-forums.com/index.php?topic=1897972>

### Question 1081

Which molecule below is an alkene?

- $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CO}_2\text{H}$
- $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$
- $(\text{CH}_3)_2\text{C}=\text{CH}_2$
- $(\text{CH}_3)_2\text{CHCH}_2\text{NH}_2$

Answer: <https://biology-forums.com/index.php?topic=1897330>



### Question 1082

What name is given to a hydrocarbon that contains a six-membered ring of alternating single and double bonds?

- aromatic
- alkyne
- alkane
- alkene
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897307>

### Question 1083

The hydrolysis of esters, amides, and nitriles \_\_\_\_\_.

- can be carried out under acidic or basic conditions
- should be carried out at pH 7.0 for optimum efficiency
- must be acid-catalyzed
- is not pH dependent
- must be base-catalyzed

Answer: <https://biology-forums.com/index.php?topic=1899022>

### Question 1084

Show the reagents necessary to prepare trans-1,2-cyclopentanediol from cyclopentene.

Answer: <https://biology-forums.com/index.php?topic=1899552>

### Question 1085

When trans-hex-3-ene is treated with  $\text{PhCO}_3\text{H}$ , the major organic product is \_\_\_\_\_.

- a meso epoxide
- a meso diol
- hexan-3-ol
- a 1:1 mixture of enantiomeric diols
- a 1:1 mixture of enantiomeric epoxides

Answer: <https://biology-forums.com/index.php?topic=1899553>

### Question 1086

Which of the following is not a condensation polymer?

- Dacron
- Lexan polycarbonate
- poly(propylene)
- Mylar
- nylon 6

Answer: <https://biology-forums.com/index.php?topic=1900294>

### Question 1087

\_\_\_\_\_ is the base-promoted hydrolysis of fats and oils.

Answer: <https://biology-forums.com/index.php?topic=1900148>

### Question 1088

Provide the structure of the predominant form of L-methionine present in an aqueous solution at biological pH, pH = 7.4.

Answer: <https://biology-forums.com/index.php?topic=1900004>

### Question 1089

Propose a mechanism with a hydride shift for the solvolysis reaction below.

Answer: <https://biology-forums.com/index.php?topic=1897863>

### Question 1090

One method of making a carbene uses diazomethane,  $\text{CH}_2\text{N}_2$ , which is zwitterionic. Draw the Lewis Structure of diazomethane and any additional resonance structures of this compound.

Answer: <https://biology-forums.com/index.php?topic=1898104>

### Question 1091

Explain the significance of the frequency factor A in the Arrhenius equation.

Answer: <https://biology-forums.com/index.php?topic=1897553>

### Question 1092

Plexiglas is a:

- polyurethane.
- polyester.
- polyamide.
- polycarbonate.
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900216>

### Question 1093

Draw the Newman projection of the anti conformation of butane.

Answer: <https://biology-forums.com/index.php?topic=1897415>

### Question 1094

Draw the structure of any diastereomer of (2S, 3R)-2,3-dichloropentane. Take particular care to indicate three-dimensional stereochemical detail properly.

Answer: <https://biology-forums.com/index.php?topic=1897659>

### Question 1095

In the proton NMR, in what region of the spectrum does one typically observe hydrogens bound to the aromatic ring?

- 1.0-1.5 ppm
- 2.0-3.0 ppm
- 4.5-5.5 ppm
- 7.0-8.0 ppm
- 9.0-10.0 ppm

Answer: <https://biology-forums.com/index.php?topic=1899823>

### Question 1096

Which of the following is the best initiator for an anionic polymerization?

- BuLi
- PhOH
- (PhCO<sub>2</sub>)<sub>2</sub>
- CH<sub>3</sub>CH(OCH<sub>3</sub>)<sub>2</sub>
- BF<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1900214>

### Question 1097

Provide the major organic product of the S<sub>N</sub>2 reaction below.

Answer: <https://biology-forums.com/index.php?topic=1897812>

### Question 1098

Which of the following statements is (are) true for the compound cis-1,2-dichlorocyclopropane?

- The enantiomer of this compound is trans-1,2-dichlorocyclopropane.
- This compound contains no asymmetric carbons.
- This compound is chiral.
- all of the above
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897722>

### Question 1099

Which of the following reagents or sequences do not produce an alcohol or diol from an alkene starting material?

- H<sup>+</sup>, H<sub>2</sub>O
- Hg(OAc)<sub>2</sub>, H<sub>2</sub>O followed by NaBH<sub>4</sub>

- HCO<sub>3</sub>H
- BH<sub>3</sub>.THF followed by H<sub>2</sub>O<sub>2</sub>, NaOH
- OsO<sub>4</sub>, H<sub>2</sub>O<sub>2</sub>

Answer: <https://biology-forums.com/index.php?topic=1898343>

### Question 1100

\_\_\_\_\_ is the n-alkane of greatest molecular weight which is a gas at room temperature and pressure.

Answer: <https://biology-forums.com/index.php?topic=1897390>

### Question 1101

Use the curved arrow formalism to indicate the movement of electron pairs in the following reaction.

Answer: <https://biology-forums.com/index.php?topic=1897228>

### Question 1102

What is suggested by the fact that benzene's molar heat of hydrogenation is 36 kcal less than three times the molar heat of hydrogenation of cyclohexene?

Answer: <https://biology-forums.com/index.php?topic=1899709>

### Question 1103

Draw the most stable conformation of cis-1,2-dimethylcyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897459>

### Question 1104

In the structure below, the sigma bond of the carbonyl is formed from the overlap of a(n) \_\_\_\_\_ atomic orbital of carbon and a(n) \_\_\_\_\_ atomic orbital of oxygen.

- sp<sup>3</sup>, sp<sup>2</sup>
- p, p
- sp, sp<sup>2</sup>
- sp<sup>2</sup>, sp<sup>2</sup>

Answer: <https://biology-forums.com/index.php?topic=1897243>

### Question 1105

In the mass spectrum of 3-methylhexanoic acid, predict the mass of the fragment resulting from a McLafferty rearrangement.

Answer: <https://biology-forums.com/index.php?topic=1898899>

### Question 1106

Which type of polymer, isotactic or atactic, tends to be stronger and stiffer? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1900335>

### Question 1107

A peak split into a doublet of triplets gave the following measurements in its splitting pattern. State the coupling constants (J values) for both the doublet and the triplet.

Answer: <https://biology-forums.com/index.php?topic=1899346>

### Question 1108

Polycaprolactone (shown below) is a biodegradable polymer that can be synthesized from a lactone. Suggest a lactone monomer that could be used to make this polymer.

-[OCO(CH<sub>2</sub>)<sub>5</sub>]-<sub>n</sub>-

Answer: <https://biology-forums.com/index.php?topic=1898966>

### Question 1109

Does the C—O bond in methanol (CH<sub>3</sub>OH) possess an individual bond dipole moment? Briefly explain your answer.

Answer: <https://biology-forums.com/index.php?topic=1897292>

### Question 1110

Provide an acceptable structure for spiro [4.4]nonane.

Answer: <https://biology-forums.com/index.php?topic=1897470>

### Question 1111

Treatment of an alkene with an alcohol in the presence of an acid catalyst produces an ether as the major organic product. Provide a mechanism that shown how this product is formed.

Answer: <https://biology-forums.com/index.php?topic=1898052>

### Question 1112

Provide the structure of the predominant form of L-valine present in an aqueous solution at biological pH, pH = 7.4.

Answer: <https://biology-forums.com/index.php?topic=1900002>

### Question 1113

Which of the following alcohols undergoes dehydration upon heating with concentrated H<sub>2</sub>SO<sub>4</sub> without carbocation rearrangement?

- 3,3-dimethylpentan-2-ol
- 3-methylpentan-3-ol
- 2-methylhexan-3-ol
- 2-methyl-2-phenylpropan-1-ol
- both A and B

Answer: <https://biology-forums.com/index.php?topic=1898491>

### Question 1114

Geranial is shown below. How many isoprene units can be found in this compound?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1900196>

### Question 1115

Provide the structure of the monomer from which PVC or poly(vinyl chloride) is made.

Answer: <https://biology-forums.com/index.php?topic=1897939>

### Question 1116

Vildagliptin is a recently released antidiabetic drug (J. Med. Chem. 2010, 7902). How many elements of unsaturation are in Vildagliptin?

- 4
- 5
- 7
- 6

Answer: <https://biology-forums.com/index.php?topic=1897241>

### Question 1117

What type of compound results from the reaction of ethyl formate with cyclohexylamine?

- nitrile
- carboxylate
- acid anhydride
- amide
- 1° amine

Answer: <https://biology-forums.com/index.php?topic=1899060>

### Question 1118

How many molecules of carbon dioxide and water are needed to make a molecule of glucose in photosynthesis?

- 6 CO<sub>2</sub> and 6 H<sub>2</sub>O
- 2 CO<sub>2</sub> and 2 H<sub>2</sub>O
- 5 CO<sub>2</sub> and 6 H<sub>2</sub>O
- 5 CO<sub>2</sub> and 5 H<sub>2</sub>O
- 6 CO<sub>2</sub> and 2 H<sub>2</sub>O

Answer: <https://biology-forums.com/index.php?topic=1899837>

### Question 1119

Which of the following terms best describes the side chain of valine?

- acidic
- charged, polar
- basic
- nonpolar
- uncharged, polar

Answer: <https://biology-forums.com/index.php?topic=1899972>

### Question 1120

How many diastereomers are there of the molecule shown below?

- 0
- 1
- 2
- 6
- 3

Answer: <https://biology-forums.com/index.php?topic=1897711>

### Question 1121

The first step of glycolysis is the keto-enol tautomerization of the 6-phosphate ester of D-glucose. Draw the product of this reaction.

Answer: <https://biology-forums.com/index.php?topic=1899921>

### Question 1122

Which amino acid has an amide group in its side chain?

- tyrosine
- tryptophan
- isoleucine
- asparagine
- histidine

Answer: <https://biology-forums.com/index.php?topic=1899967>

### Question 1123

What is meant by the mechanism of a chemical reaction?

Answer: <https://biology-forums.com/index.php?topic=1897478>

### Question 1124

Although F is more electronegative than Cl, the C-Cl bond has a larger dipole moment than the C-F bond. Explain.

Answer: <https://biology-forums.com/index.php?topic=1897774>

### Question 1125

Describe, in short phrases, the three step mechanism by which hexanoyl chloride reacts with dimethylamine.

Answer: <https://biology-forums.com/index.php?topic=1899009>

### Question 1126

Devise an efficient method for preparing 3-bromotoluene from toluene.

Answer: <https://biology-forums.com/index.php?topic=1898840>

### Question 1127

What gaseous byproduct is evolved when sodium metal is added to ethanol?

Answer: <https://biology-forums.com/index.php?topic=1898333>

### Question 1128

Treatment of a nitrile with a Grignard reagent followed by hydrolysis results in \_\_\_\_\_.

- an alcohol
- an aldehyde
- a ketone
- an ether

• an ester

Answer: <https://biology-forums.com/index.php?topic=1898672>

### Question 1129

In addition to a carbonyl stretch, which of the following molecules exhibits two characteristic stretches at 2700 and 2800  $\text{cm}^{-1}$ ?

- $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCl}$
- $(\text{CH}_3\text{CH}_2)_2\text{CO}$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CO}_2\text{H}$
- $\text{CH}_3\text{CH}_2\text{CO}_2\text{CH}_3$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$

Answer: <https://biology-forums.com/index.php?topic=1899251>

### Question 1130

Most naturally occurring amino acids are L-amino acids. Does this mean they are levorotatory? Explain.

Answer: <https://biology-forums.com/index.php?topic=1899981>

### Question 1131

Provide a detailed, stepwise mechanism for the reaction of propanoic anhydride with phenol.

Answer: <https://biology-forums.com/index.php?topic=1899051>

### Question 1132

The process by which enantiomers are separated is called \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897730>

### Question 1133

Draw three repeating units of poly(vinyl chloride), having syndiotactic stereochemistry.

Answer: <https://biology-forums.com/index.php?topic=1900262>

### Question 1134

Arrange the following regions of the electromagnetic spectrum in order of increasing energy: microwave, UV, visible, and IR.

Answer: <https://biology-forums.com/index.php?topic=1899197>

### Question 1135

How can the degree of unsaturation of an oil be gauged using a solution of bromine in carbon tetrachloride?

Answer: <https://biology-forums.com/index.php?topic=1900138>

### Question 1136

Draw the structure of a micelle and label which part is hydrophobic and which is hydrophilic.

Answer: <https://biology-forums.com/index.php?topic=1900144>

### Question 1137

Draw an acceptable structure for (R)-5,5-dimethylhept-6-yn-3-ol

Answer: <https://biology-forums.com/index.php?topic=1898154>

### Question 1138

Show how an enolate can add to a carbonyl.

Answer: <https://biology-forums.com/index.php?topic=1899078>

### Question 1139

A D-aldopentose is subjected to Kiliani-Fischer chain lengthening. What products result?

- two aldohexoses which are epimeric at C2
- two aldohexoses which are epimeric at C3
- two enantiomeric aldohexoses
- a D-aldohexose and an L-aldohexose
- two enantiomeric aldopentoses

Answer: <https://biology-forums.com/index.php?topic=1899933>

### Question 1140

For the compound below, the number of 1°, 2° and 3° hydrogens, respectively is \_\_\_\_\_.

- 1, 6 and 0
- 3, 6 and 1
- 1, 3, and 1
- 3, 6 and 2

Answer: <https://biology-forums.com/index.php?topic=1897496>

### Question 1141

Identify the correct name for the following structure.

- 3-methoxy-5-methylcyclohepta-1,5-diene
- 6-methoxy-1-methylcyclohepta-1,4-diene
- 4-methoxy-2-methylcyclohepta-1,5-diene
- 7-methoxy-5-methylcyclohepta-1,4-diene

Answer: <https://biology-forums.com/index.php?topic=1897920>

### Question 1142

Provide a structure of the tripeptide SGD.

Answer: <https://biology-forums.com/index.php?topic=1900046>

### Question 1143

Provide the structure of isopropyl iodide.

Answer: <https://biology-forums.com/index.php?topic=1897757>

### Question 1144

From the perspective of viewing down the C2—C3 bond, draw the Newman projection of the most stable conformation of 2,3-dimethylbutane.

Answer: <https://biology-forums.com/index.php?topic=1897424>

### Question 1145

The Diels-Alder reaction is a concerted reaction; this means \_\_\_\_\_.

- all bond making and bond breaking occurs simultaneously
- the products contain rings
- a mixture of endo and exo products are formed
- the reaction is highly endothermic
- the reaction follows Markovnikov's rule

Answer: <https://biology-forums.com/index.php?topic=1899656>

### Question 1146

Rank the following compounds in order of increasing boiling point (lowest to highest): triethylamine, cyclohexylamine, di-n-propylamine.

Answer: <https://biology-forums.com/index.php?topic=1898771>

### Question 1147

Provide the structure of N-ethyl-1-butanamine.

Answer: <https://biology-forums.com/index.php?topic=1898734>

### Question 1148

Which of the following has the highest boiling point?

- 
- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1897294>

### Question 1149

Rank the following molecules in order of increasing relative rate of SN1 solvolysis with methanol and heat (slowest to fastest reacting).

- $2 < 3 < 4 < 1 < 5$
- $5 < 4 < 3 < 2 < 1$
- $1 < 2 < 5 < 4 < 3$
- $2 < 3 < 4 < 5 < 1$
- $3 < 2 < 4 < 5 < 1$

Answer: <https://biology-forums.com/index.php?topic=1897826>

### Question 1150

Which base, ammonia (NH<sub>3</sub>) or triethylamine [(CH<sub>3</sub>CH<sub>2</sub>)<sub>3</sub>N], would be a better choice for use in converting 1-chlorohexane to hex-1-ene? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1897993>

### Question 1151

Draw (Z)-1,3-hexadiene in its s-trans conformation.

Answer: <https://biology-forums.com/index.php?topic=1899599>

### Question 1152

Use the following structure for the two questions below.

Saquinavir Structure

Which of the following functional groups is not present in the HIV protease inhibitor drug called Saquinavir?

- amide
- aromatic
- amine
- ketone
- alcohol

Answer: <https://biology-forums.com/index.php?topic=1897325>

### Question 1153

Which of the following alkyl halides would be suitable to use when forming a Grignard reagent?

- CH<sub>3</sub>COCH<sub>2</sub>CH<sub>2</sub>Br
- BrCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CN
- H<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>Br
- (CH<sub>3</sub>)<sub>2</sub>NCH<sub>2</sub>CH<sub>2</sub>Br
- all of the above

Answer: <https://biology-forums.com/index.php?topic=1898388>

### Question 1154

Which of the molecules below has the higher boiling point? Briefly explain your choice.

CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub> or (CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>CH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1897299>

### Question 1155

In a 1-butanol molecule, what part of the molecule is described as hydrophobic?

Answer: <https://biology-forums.com/index.php?topic=1898325>

### Question 1156

Provide the structure of isotactic polypropylene.

Answer: <https://biology-forums.com/index.php?topic=1900256>

### Question 1157

If stronger bonds are formed and weaker bonds are broken, then the reaction is \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897518>

### Question 1158

Lecithins are phospholipids wherein the alcohol choline is esterified to a phosphatidic acid. Provide the structure of choline.

Answer: <https://biology-forums.com/index.php?topic=1900177>

### Question 1159



What IR absorption is characteristic of the C-H stretch in alkanes?

- 3300  $\text{cm}^{-1}$
- 1710  $\text{cm}^{-1}$
- 2250  $\text{cm}^{-1}$
- 3500  $\text{cm}^{-1}$
- 2950  $\text{cm}^{-1}$

Answer: <https://biology-forums.com/index.php?topic=1899231>

### Question 1160

Provide a mechanism to show how  $\text{H}_2\text{CCHCO}_2\text{CH}_3$  is polymerized using butyllithium as the initiator.

Answer: <https://biology-forums.com/index.php?topic=1900251>

### Question 1161

Using any compound that contains a carbonyl as your starting material, how would you synthesize acetone,  $\text{CH}_3\text{COCH}_3$ ?

Answer: <https://biology-forums.com/index.php?topic=1898412>

### Question 1162

Does the alkene shown below violate Bredt's rule?

Answer: <https://biology-forums.com/index.php?topic=1897957>

### Question 1163

When 2,2-dimethylbutane is subjected to free-radical chlorination, \_\_\_\_\_ distinct monochlorinated products are possible and \_\_\_\_\_ of these contain asymmetric carbon atoms.

- 4; 0
- 4; 2
- 5; 0
- 5; 2
- 3; 0

Answer: <https://biology-forums.com/index.php?topic=1897778>

### Question 1164

Captopril is used to treat high blood pressure and congestive heart failure. Label the chiral centers as R or S.

Answer: <https://biology-forums.com/index.php?topic=1897667>

### Question 1165

Peramivir, shown below, has shown to be effective against the influenza B virus (J. Med. Chem. 2010, 6421). Which sequence ranks the following nitrogen atoms in order of increasing basicity?

- 1

### Question 1166

Maleic anhydride (below) undergoes chain-growth polymerization but not step-growth polymerizations. Why not?

Answer: <https://biology-forums.com/index.php?topic=1900267>

### Question 1167

In electrophilic aromatic substitution reactions, a cyano substituent on the aromatic ring is \_\_\_\_\_.

- a deactivator and a m-director
- a deactivator and an o,p-director
- an activator and an o,p-director
- an activator and a m-director
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898557>

### Question 1168

How might the proton spectrum of ultrapure dimethylamine,  $(\text{CH}_3)_2\text{NH}$ , differ from the spectrum of this compound to which  $\text{D}_2\text{O}$  has been added?

Answer: <https://biology-forums.com/index.php?topic=1899354>

### Question 1169

Devise an efficient method for preparing fluorobenzene from benzene.

Answer: <https://biology-forums.com/index.php?topic=1898830>

### Question 1170

In theory a poorly planned crossed aldol reaction can produce how many different products?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1899136>

### Question 1171

In the diene shown below, there are two possible double bonds that could react when 1 eq. of HBr is added. However, the double bond labeled "A" reacts preferentially to give the major product. Using resonance structures, justify this observation.

Answer: <https://biology-forums.com/index.php?topic=1899625>

### Question 1172

Which of the following descriptions apply to both dihydroxyacetone and D-fructofuranose?

I.They are both ketoses.II.They are both aldoses.III.They are enantiomers of each other.IV.They are diastereomers of each other.V.They are epimers of each other.

- I
- II
- II and IV
- II, IV and V
- I and III

Answer: <https://biology-forums.com/index.php?topic=1899860>

### Question 1173

In electrophilic aromatic substitution reactions a bromine substituent \_\_\_\_\_.

- is an activator and an o,p-director
- is a deactivator and an o,p-director
- is a deactivator and a m-director
- is an activator and a m-director
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898531>

### Question 1174

The IR spectrum of a sample contains absorptions at 3050, 2950, and 1620  $\text{cm}^{-1}$ . To what class of organic compound does this sample most likely belong?

- alkane
- ester
- alcohol
- alkene
- alkyne

Answer: <https://biology-forums.com/index.php?topic=1899234>

### Question 1175

Provide the structure of cyclohexyl formate.

Answer: <https://biology-forums.com/index.php?topic=1898968>

### Question 1176

Which compound lacks a strong, characteristic IR absorption near 1700  $\text{cm}^{-1}$ ?

- $\text{CH}_3\text{CH}_2\text{CO}_2\text{H}$
- $(\text{CH}_3\text{CH}_2)_2\text{C}=\text{O}$
- $\text{CH}_3\text{CH}_2\text{CHO}$

- $(\text{CH}_3\text{CH}_2)_2\text{O}$
- $\text{H}_3\text{CH}_2\text{CO}_2\text{CH}_3$

Answer: <https://biology-forums.com/index.php?topic=1899245>

### Question 1177

Why is carbon-hydrogen splitting not a major part of  $^1\text{H}$  NMR spectra?

Answer: <https://biology-forums.com/index.php?topic=1899337>

### Question 1178

Chymotrypsin is an enzyme which cleaves a peptide chain at the carboxyl groups of three aromatic amino acid residues. Name these three.

Answer: <https://biology-forums.com/index.php?topic=1900068>

### Question 1179

What type of polymer is Lexan?

- polycarbonate
- polyurethane
- polyester
- polyamide

Answer: <https://biology-forums.com/index.php?topic=1900296>

### Question 1180

Which tend to exhibit a higher degree of crystallinity, isotactic or atactic polymers? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1900336>

### Question 1181

Which of the following statements concerning the conformers of butane is true?

- The lowest energy conformer of butane is the gauche conformer.
- The eclipsed and totally eclipsed conformers have the same amount of nonbonded strain.
- There is more torsional strain in the anti conformer than in the totally eclipsed conformer.
- Unlike ethane, all butane conformers are classified as eclipsed.
- The gauche and anti conformers differ primarily in the amount of nonbonded strain present.

Answer: <https://biology-forums.com/index.php?topic=1897413>

### Question 1182

How many distinct alkynes exist with a molecular formula of  $\text{C}_4\text{H}_6$ ?

- 0
- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1898139>

### Question 1183

Complete the structure of methyl azide by adding any necessary formal charges.

Answer: <https://biology-forums.com/index.php?topic=1897245>

### Question 1184

In the Fischer projection of D-(+)-glyceraldehyde, the hydroxyl group on the asymmetric carbon center is \_\_\_\_\_.

- on the top
- at the left
- on the bottom
- at the right
- present as a hemiacetal

Answer: <https://biology-forums.com/index.php?topic=1899839>

### Question 1185

Which of the following species is not formed through a termination reaction in the chlorination of methane?

- $\text{H}_2$

- HCl
- CH<sub>3</sub>CH<sub>3</sub>
- CH<sub>3</sub>Cl

Answer: <https://biology-forums.com/index.php?topic=1897479>

### Question 1186

Provide the reagents necessary to accomplish the following transformation.  
2-methyl-2-octene to 2-methyloctan-3-ol

Answer: <https://biology-forums.com/index.php?topic=1898347>

### Question 1187

Which of the following acids has the most stable conjugate base?

- CH<sub>3</sub>CH<sub>2</sub>OH
- CH<sub>3</sub>SO<sub>3</sub>H
- CH<sub>3</sub>CHO
- CH<sub>3</sub>CH<sub>2</sub>SH
- CH<sub>3</sub>CO<sub>2</sub>H

Answer: <https://biology-forums.com/index.php?topic=1897139>

### Question 1188

Describe the intermolecular interaction of the surface carboxylate groups of a micelle and the surrounding water.

Answer: <https://biology-forums.com/index.php?topic=1900154>

### Question 1189

Shown below is the structure of Lactimidomycin, a potent inhibitor of cell migration, proliferation and protein synthesis. Identify the carboxylic acid derivative/s in the structure of Lactimidomycin.

- Imine
- Ester
- Anhydride
- Nitrile

Answer: <https://biology-forums.com/index.php?topic=1899004>

### Question 1190

Draw an acceptable line-angle formula for cyclobutanol (shown below).

Answer: <https://biology-forums.com/index.php?topic=1897203>

### Question 1191

All naturally occurring sugars can be degraded to \_\_\_\_\_.

- D-(-)-glyceraldehyde
- L-(+)-glyceraldehyde
- L-(-)-glyceraldehyde
- D-(+)-glyceraldehyde
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1899844>

### Question 1192

Which energetic material is a nitrate ester?

- nitromethane
- TNT
- RDX
- nitroglycerin

Answer: <https://biology-forums.com/index.php?topic=1898509>

### Question 1193

How could tell a sample of n-butanol from tert-butanol?

Answer: <https://biology-forums.com/index.php?topic=1898463>

### Question 1194

Draw the LUMO of pentadienyl anion.

Answer: <https://biology-forums.com/index.php?topic=1899640>

### Question 1195

Draw the Lewis structure of acetic acid,  $\text{CH}_3\text{CO}_2\text{H}$ , including all non-bonding lone pairs.

Answer: <https://biology-forums.com/index.php?topic=1897164>

### Question 1196

In a mass spectrum, the peak of greatest abundance is referred to as the \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1899287>

### Question 1197

What is the CCC bond angle in  $(\text{CH}_3)_3\text{C}^+$ ?

[html]What is the CCC bond angle in  $(\text{CH}_3)_3\text{C}^-$ ?[/html]

What is the hybridization of the positively charged carbon in  $(\text{CH}_3)_3\text{C}^+$ ?

What is the hybridization of the negatively charged carbon in  $(\text{CH}_3)_3\text{C}^-$ ?

Answer: <https://biology-forums.com/index.php?topic=1897601>

### Question 1198

Including all possible stereoisomeric forms, how many distinct allylic bromides could be produced when 2-methylpent-1-ene is treated with NBS under irradiation by a sunlamp?

- 3
- 6
- 5
- 4
- 2

Answer: <https://biology-forums.com/index.php?topic=1899628>

### Question 1199

When pent-1-ene is treated with mercury(II) acetate in methanol and the resulting product is reacted with  $\text{NaBH}_4$ , what is the primary organic compound which results?

- 3-ethoxypentane
- 1-ethoxypentane
- 1-methoxypentane
- 2-ethoxypentane
- 2-methoxypentane

Answer: <https://biology-forums.com/index.php?topic=1899524>

### Question 1200

What synthetic goal is achieved by subjecting an alkene to an oxymercuration-demercuration sequence?

- Markovnikov addition of  $\text{H}_2\text{O}$  wherein skeletal rearrangement is prevented
- anti-Markovnikov addition of  $\text{H}_2\text{O}$  wherein skeletal rearrangement is promoted
- Markovnikov addition of  $\text{H}_2\text{O}$  wherein skeletal rearrangement is promoted
- syn-hydroxylation
- anti-Markovnikov addition of  $\text{H}_2\text{O}$  wherein skeletal rearrangement is prevented

Answer: <https://biology-forums.com/index.php?topic=1898057>

### Question 1201

Draw the shape of a 2p orbital, including shading to indicate phase.

Answer: <https://biology-forums.com/index.php?topic=1897160>

### Question 1202

Oxidation of a  $1^\circ$  alcohol with pyridinium chlorochromate results in the production of \_\_\_\_\_.

- an aldehyde
- a ketone
- an ether
- an ester
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898662>

### Question 1203

Suggest a method for resolving a racemic acid.

Answer: <https://biology-forums.com/index.php?topic=1900030>

### Question 1204

If a signal is observed in the 170 to 200 ppm range in a  $^{13}\text{C}$  NMR spectrum, what is the most likely type of functional group associated with that carbon atom?

- carbon/carbon triple bond
- aromatic carbon
- allylic carbon
- carbonyl carbon
- carbon/carbon double bond

Answer: <https://biology-forums.com/index.php?topic=1899358>

### Question 1205

Draw a chair conformation of the starting substituted cyclohexane molecule with the bromine in the axial position. Using this model, predict the major elimination product of this reaction.

Answer: <https://biology-forums.com/index.php?topic=1897866>

### Question 1206

What compound is produced when N,N-dimethylpropanamide is treated with  $\text{LiAlH}_4$ ?

- $\text{CH}_3\text{CH}_2\text{CONH}_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- $\text{CH}_3\text{CH}_2\text{N}(\text{CH}_3)_2$

Answer: <https://biology-forums.com/index.php?topic=1899032>

### Question 1207

Covalent bonds may be polar or nonpolar. What property of the atoms forming a given bond determines this?

Answer: <https://biology-forums.com/index.php?topic=1897108>

### Question 1208

Why are strongly acidic reagents inappropriate when attempting an electrophilic aromatic substitution with aniline?

Answer: <https://biology-forums.com/index.php?topic=1898803>

### Question 1209

When one compares the densities of n-hexane and water, one finds \_\_\_\_\_.

- that the relative densities of two immiscible compounds cannot be measured
- that n-hexane is less dense than water
- that these two compounds have the same density
- that n-hexane is more dense than water

Answer: <https://biology-forums.com/index.php?topic=1897386>

### Question 1210

Which pair of reagents would produce the highest yield of (R)-2-ethoxybutane?

- sodium (S)-2-butoxide + iodoethane
- sodium ethoxide + (R)-2-iodobutane
- sodium ethoxide + (S)-2-iodobutane
- sodium (R)-2-butoxide + iodoethane
- Both B and C would work equally well.

Answer: <https://biology-forums.com/index.php?topic=1899515>

### Question 1211

The reagent used in the determination of the N-terminal amino acid residue of a peptide is \_\_\_\_\_.

- peroxyformic acid
- dicyclohexylcarbodiimide

- carboxypeptidase
- phenyl isothiocyanate
- ethyl chloroformate

Answer: <https://biology-forums.com/index.php?topic=1900054>

### Question 1212

Under what conditions is the methyl glycoside of galactose hydrolyzed?

Answer: <https://biology-forums.com/index.php?topic=1899908>

### Question 1213

If the equilibrium constant ( $K_{eq}$ ) of a reaction is 0.5 then which of the following that must be true?

- Reaction equilibrium will favor the products.
- The reaction will have an early transition state.
- Gibbs free energy ( $G$ ) is negative.
- Gibbs free energy ( $G$ ) is positive.

Answer: <https://biology-forums.com/index.php?topic=1897506>

### Question 1214

What two starting materials yield  $\text{OHCCH}_2\text{CO}_2\text{CH}_2\text{CH}_3$  as the crossed Claisen condensation product?

Answer: <https://biology-forums.com/index.php?topic=1899158>

### Question 1215

Show the deprotonation of benzoic acid by hydroxide and draw the important resonance structures of the carboxylate ion.

Answer: <https://biology-forums.com/index.php?topic=1898891>

### Question 1216

What term describes the structural relationship between (2R,3R,4S)-2,3,4-trichloroheptane and (2S,3S,4R)-2,3,4-trichloroheptane?

- constitutional isomers
- diastereomers
- enantiomers
- conformers
- not isomers

Answer: <https://biology-forums.com/index.php?topic=1897624>

### Question 1217

Which of the following terms best describes terpenes?

- protein
- carbohydrate
- ionic
- nucleic acid
- nonpolar

Answer: <https://biology-forums.com/index.php?topic=1900199>

### Question 1218

By using the appropriate molecular formulas, write a balanced equation which describes the complete combustion of nonane.

Answer: <https://biology-forums.com/index.php?topic=1897405>

### Question 1219

Show all organic products when ninhydrin reacts with histidine.

Answer: <https://biology-forums.com/index.php?topic=1900058>

### Question 1220

Provide the structure of the monomer from which Teflon is formed.

Answer: <https://biology-forums.com/index.php?topic=1900224>

### Question 1221

Which of the following will result in removal of a benzyl ester protecting group?

- decarbonylation only
- catalytic hydrogenation only
- acid hydrolysis only
- both acid hydrolysis and decarbonylation
- both catalytic hydrogenation and acid hydrolysis

Answer: <https://biology-forums.com/index.php?topic=1900031>

### Question 1222

In electrophilic aromatic substitution reactions the hydroxyl group is an o,p-director because \_\_\_\_\_.

- it donates electron density to the ring by induction and destabilizes the meta sigma complex
- it withdraws electron density from the ring by induction and destabilizes the meta sigma complex
- it donates electron density to the ring by resonance and stabilizes the ortho and para sigma complexes
- it donates electron density to the ring by induction and stabilizes the ortho and para sigma complexes
- it donates electron density to the ring by resonance and destabilizes the meta sigma complex

Answer: <https://biology-forums.com/index.php?topic=1898546>

### Question 1223

A condensed structure for acetone is CH<sub>3</sub>COCH<sub>3</sub>. Provide the structural formula for acetone.

Answer: <https://biology-forums.com/index.php?topic=1897197>

### Question 1224

In the chromic acid oxidation of alcohols, the chromium is \_\_\_\_\_.

- reduced from Cr+6 to Cr+3
- reduced from Cr+3 to Cr+6
- oxidized from Cr+6 to Cr+3
- oxidized from Cr+3 to Cr+6
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898421>

### Question 1225

The structure of morphine is shown below. The amine in morphine is classified as \_\_\_\_\_.

- 1°
- 2°
- 3°
- aryl

Answer: <https://biology-forums.com/index.php?topic=1898733>

### Question 1226

How many asymmetric carbons are present in the compound below?

3-ethyl-2,2,4-trimethylpentane

Answer: <https://biology-forums.com/index.php?topic=1897639>

### Question 1227

How would one use a Grignard-based synthesis to accomplish the following transformation?

benzyl bromide (PhCH<sub>2</sub>Br) to 3-phenylpropan-1-ol

Answer: <https://biology-forums.com/index.php?topic=1898384>

### Question 1228

Which of the following correctly ranks the cycloalkanes in order of increasing ring strain per methylene?

- cyclopropane < cyclopentane < cyclobutane < cyclohexane
- cyclohexane < cyclopentane < cyclobutane < cyclopropane
- cyclohexane < cyclobutane < cyclopentane < cyclopropane
- cyclopentane < cyclopropane < cyclobutane < cyclohexane
- cyclopropane < cyclobutane < cyclohexane < cyclopentane

Answer: <https://biology-forums.com/index.php?topic=1897436>

### Question 1229

Provide the two propagation steps in the free-radical chlorination of ethane.

Answer: <https://biology-forums.com/index.php?topic=1897489>



### Question 1230

Indicate whether the following cyclization, conducted under thermal conditions, is symmetry allowed. Justify your answer by showing whether the overlapping orbitals in the transition state generate a symmetry-allowed or symmetry-forbidden scenario. Treat ethylene as the nucleophile.

Answer: <https://biology-forums.com/index.php?topic=1899692>

### Question 1231

Provide the sequence of reactions by which propoxycyclohexane can be prepared through a Williamson ether synthesis.

Answer: <https://biology-forums.com/index.php?topic=1899519>

### Question 1232

The proton NMR spectrum of an unknown compound contains a triplet at Which of the following could be this unknown?

- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H
- CH<sub>3</sub>CO CH<sub>2</sub>Ph
- PhCHO
- (CH<sub>3</sub>)<sub>3</sub>CCHO
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CHO

Answer: <https://biology-forums.com/index.php?topic=1898651>

### Question 1233

Which of the following compounds is least reactive in the nucleophilic aromatic substitution reaction with NaOH?

- o-nitrochlorobenzene
- 2,4-dinitrochlorobenzene
- m-nitrochlorobenzene
- p-nitrochlorobenzene
- 3,5-dinitrochlorobenzene

Answer: <https://biology-forums.com/index.php?topic=1898597>

### Question 1234

What is the expected multiplicity and relative ratio of the area of the peak for the protons labeled Ha?

- triplet with relative area of 1:1:1
- triplet with relative area of 1:3:1
- multiplet with relative area of 1:6:15:20:15:6:1
- singlet with relative area of 1

Answer: <https://biology-forums.com/index.php?topic=1899344>

### Question 1235

Which sequence ranks the following carboxylic acid derivatives in order of increasing rate of hydrolysis?

- 2 < 3 < 1
- 2 < 1 < 3
- 3 < 2 < 1
- 1 < 3 < 2

Answer: <https://biology-forums.com/index.php?topic=1899025>

### Question 1236

Provide a series of synthetic steps by which 4-phenylheptan-4-ol can be prepared from benzene.

Answer: <https://biology-forums.com/index.php?topic=1898609>

### Question 1237

Provide a detailed, stepwise mechanism for the base-mediated transesterification of methyl benzoate with sodium ethoxide.

Answer: <https://biology-forums.com/index.php?topic=1899016>

### Question 1238

What is the major organic product that results when 3-heptyne is treated with sodium metal in ammonia?

- 2-heptyne
- (Z)-2-heptene
- (Z)-3-heptene
- (E)-3-heptene

- heptane

Answer: <https://biology-forums.com/index.php?topic=1898258>

### Question 1239

Through what mechanism can a 1,2-halohydrin be converted into an epoxide?

- SN1
- SN2
- polymerization
- E2
- electrophilic addition

Answer: <https://biology-forums.com/index.php?topic=1899557>

### Question 1240

What is the approximate pKa of phenols?

Answer: <https://biology-forums.com/index.php?topic=1898335>

### Question 1241

Sucrose is hydrolyzed to what two monosaccharides?

- glucose and fructose
- maltose and fructose
- glucose and galactose
- galactose and lactose
- galactose and maltose

Answer: <https://biology-forums.com/index.php?topic=1899939>

### Question 1242

What are the major organic products when 1 equivalent of acetic formic anhydride reacts with 1 equivalent of methanol?

Answer: <https://biology-forums.com/index.php?topic=1899050>

### Question 1243

Which of the following corresponds to the COC bond angle in dimethyl ether?

- 60°
- 180°
- 122°
- 94°
- 110°

Answer: <https://biology-forums.com/index.php?topic=1899480>

### Question 1244

Draw the Fischer projection of L-valine at a pH of 2.

Answer: <https://biology-forums.com/index.php?topic=1899997>

### Question 1245

Stereoisomers which are not mirror image isomers are \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897698>

### Question 1246

What type of polymer is formed from lactam monomers?

- polycarbonates
- polyurethanes
- polyesters
- polyamides
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900304>

### Question 1247

Which of the following species is the least nucleophilic?

- H<sub>2</sub>O
- CN<sup>-</sup>

- (CH<sub>3</sub>)<sub>3</sub>N
- BF<sub>3</sub>
- CH<sub>3</sub>O-

Answer: <https://biology-forums.com/index.php?topic=1897789>

### Question 1248

Which of the following best describes the relationship between the two structures shown?

- They represent different compounds that are alkanes.
- They represent different compounds that are constitutional isomers.
- They represent the same compound.
- They represent different compounds that are geometric isomers.
- They represent different compounds that are alkenes.

Answer: <https://biology-forums.com/index.php?topic=1897268>

### Question 1249

Under what reaction conditions does the electrophilic chlorination of aromatic compounds usually occur?

- NaCl, H<sub>2</sub>O
- Cl<sub>2</sub>, H<sub>2</sub>O
- Cl<sub>2</sub>, CCl<sub>4</sub>
- Cl<sub>2</sub>, AlCl<sub>3</sub>
- NaCl, CH<sub>3</sub>OH

Answer: <https://biology-forums.com/index.php?topic=1898529>

### Question 1250

A nucleus with an \_\_\_\_\_ atomic number or an \_\_\_\_\_ mass number has a nuclear spin that can be observed by the NMR spectrometer.

- odd; even
- even; odd
- even; even
- odd; odd

Answer: <https://biology-forums.com/index.php?topic=1899313>

### Question 1251

In the group shown below, which of the following alcohols is (are) likely to yield a product where skeletal rearrangement has occurred when treated with sulfuric acid?

3-methyl-3-pentanol, 3,3-dimethyl-2-butanol, 2,2-dimethylcyclohexanol

- 3-methyl-3-pentanol only
- 2,2-dimethylcyclohexanol only
- 3,3-dimethyl-2-butanol only
- both 3,3-dimethyl-2-butanol and 2,2-dimethylcyclohexanol
- None of these three alcohols is prone to rearrangement.

Answer: <https://biology-forums.com/index.php?topic=1898006>

### Question 1252

A mixture of two enantiomers with a composition of 65.0% R has an observed rotation of  $-25.3^\circ$  in a polarimeter tube. If the mixture has a concentration of 2.038 g/mL at 25°C, what is the predicted \_\_\_\_\_ of an optically pure sample of the S enantiomer?

- $-53.5^\circ$
- $+53.5^\circ$
- $+12.4^\circ$
- $-25.3^\circ$
- $+41.3^\circ$

Answer: <https://biology-forums.com/index.php?topic=1897684>

### Question 1253

Provide a structural representation of isopropyl tert-butyl ether.

Answer: <https://biology-forums.com/index.php?topic=1899489>

### Question 1254

Arrange the following compounds in order of increasing acidity:  
acetone, ethyl acetoacetate, ethyl acetate, and ethanol.

Answer: <https://biology-forums.com/index.php?topic=1899165>

### Question 1255

There are three isomeric methylbutene structures. Draw each of them and then circle the isomer with the highest heat of hydrogenation.

Answer: <https://biology-forums.com/index.php?topic=1897964>

### Question 1256

Which of the following pairs of bases lists the stronger base first?

- I<sup>-</sup> > Cl<sup>-</sup>
- H<sub>2</sub>O > HO<sup>-</sup>
- CH<sub>3</sub>COO<sup>-</sup> > HO<sup>-</sup>
- H<sub>2</sub>N<sup>-</sup> > CH<sub>3</sub>COO<sup>-</sup>
- HO<sup>-</sup> > H<sub>2</sub>N<sup>-</sup>

Answer: <https://biology-forums.com/index.php?topic=1897131>

### Question 1257

1-Hexanol reacts with chromic acid to yield what product?

Answer: <https://biology-forums.com/index.php?topic=1898902>

### Question 1258

What is the major organic product when n-butanol reacts with hydrochloric acid?

Answer: <https://biology-forums.com/index.php?topic=1898420>

### Question 1259

Which sequence correctly ranks the following protons in order of increasing pK<sub>a</sub> value?

- 3

### Question 1260

Given a single triglyceride which contains three identical and fully saturated fatty acid residues, which of the following terms accurately describe(s) it?

- chiral
- optically inactive
- meso
- optically active
- both A and B

Answer: <https://biology-forums.com/index.php?topic=1900145>

### Question 1261

What compound has a significant m/z 70 in its mass spectrum?

- octane
- 2-butanol
- diethyl ether
- (E)-2-pentene
- 1-pentanol

Answer: <https://biology-forums.com/index.php?topic=1899310>

### Question 1262

Strong bases usually contain positively charged atoms of high electronegativity and no resonance stabilization.

- true
- false

Answer: <https://biology-forums.com/index.php?topic=1897133>

### Question 1263

When the relative energies of the s-cis and s-trans conformers of 1,3-butadiene are compared, one finds that \_\_\_\_\_.

- the s-cis conformer is lower in energy than the s-trans
- the two conformers are of equal energy
- the s-trans conformer is lower in energy than the s-cis

Answer: <https://biology-forums.com/index.php?topic=1899586>

### Question 1264

Provide the structure of the enol of 2,2,4-trimethyl-3-pentanone.

Answer: <https://biology-forums.com/index.php?topic=1899093>

### Question 1265

Provide the structure of 3,3-dimethylheptanoic acid.

Answer: <https://biology-forums.com/index.php?topic=1898855>

### Question 1266

Why doesn't cyclohexene have cis/trans isomers?

Answer: <https://biology-forums.com/index.php?topic=1897936>

### Question 1267

Using any alkene as your starting material, how could you make the alkyl halide shown?

Answer: <https://biology-forums.com/index.php?topic=1898033>

### Question 1268

While you were up late one night studying organic chemistry, you happened to see the last 5 minutes of an infomercial on TV. The spokesperson claimed that their brand of automobile tires were superior to all other brands on the market because they were made by using only natural rubber, isolated from the resin of rubber trees. How could a chemist test her claims that no petroleum products went into the manufacture of her brand of tires?

Answer: <https://biology-forums.com/index.php?topic=1897158>

### Question 1269

Provide the structure of the predominant form of L-alanine present in an aqueous solution at pH 2.

Answer: <https://biology-forums.com/index.php?topic=1900007>

### Question 1270

If (S)-glyceraldehyde has a specific rotation of  $-8.7^\circ$ , what is the specific rotation of (R)-glyceraldehyde?

- $-8.7^\circ$
- $+8.7^\circ$
- $0.0^\circ$
- cannot be determined from the information given

Answer: <https://biology-forums.com/index.php?topic=1897674>

### Question 1271

How many methylene groups are present in 2,4-dimethylhexane?

- 0
- 2
- 6
- 1
- 8

Answer: <https://biology-forums.com/index.php?topic=1897347>

### Question 1272

What compound exhibits only two signals in its  $^1\text{H}$  NMR spectrum, a triplet and a quintet?

- $\text{BrCH}_2\text{CH}_2\text{CH}_2\text{Cl}$
- $(\text{CH}_3)_2\text{CHOCH}(\text{CH}_3)_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
- $\text{BrCH}_2\text{CH}_2\text{CH}_2\text{Br}$
- $(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)_2$

Answer: <https://biology-forums.com/index.php?topic=1899338>

### Question 1273

When  $\text{CH}_3\text{CH}_2\text{CHO}$  reacts with  $\text{PhNHNH}_2$  under conditions of acid catalysis, the major organic product is \_\_\_\_\_.

- an imine
- a nitrile
- a ketone
- a hydrazone
- an oxime

Answer: <https://biology-forums.com/index.php?topic=1898792>

### Question 1274

What two organic starting materials are required to produce cinnamaldehyde via a crossed aldol condensation followed by dehydration?

Answer: <https://biology-forums.com/index.php?topic=1899137>

### Question 1275

Describe a sequence of reactions by which butylbenzene can be straightforwardly prepared from phenylacetylene.

Answer: <https://biology-forums.com/index.php?topic=1898229>

### Question 1276

An optically active D-aldopentose produced an optically inactive alditol upon treatment with NaBH<sub>4</sub>. When this aldopentose was subjected to a Ruff degradation, a D-aldotetrose was generated. This aldotetrose gave an optically active aldaric acid upon oxidation with HNO<sub>3</sub>. Use these data to provide the structure of the starting D-aldopentose.

Answer: <https://biology-forums.com/index.php?topic=1899931>

### Question 1277

Draw (E)-1,3-hexadiene in its s-cis conformation.

Answer: <https://biology-forums.com/index.php?topic=1899597>

### Question 1278

Which of the following compounds will undergo bromination most rapidly using Br<sub>2</sub>, FeBr<sub>3</sub>?

- acetanilide
- bromobenzene
- p-methylacetanilide
- dibromobenzene
- benzenesulfonic acid

Answer: <https://biology-forums.com/index.php?topic=1898541>

### Question 1279

What reagent can be used to convert 2-methylbutan-1-ol into 2-methylbutanal?

- Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>
- LiAlH<sub>4</sub>
- PCC
- O<sub>3</sub>
- KMnO<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1898658>

### Question 1280

Draw a Newman Projection along the C3-C4 for the molecule shown below. (C3 should be in front.)

Answer: <https://biology-forums.com/index.php?topic=1897475>

### Question 1281

Propose a synthesis of PhNHCHO from benzene.

Answer: <https://biology-forums.com/index.php?topic=1899062>

### Question 1282

The energy of a photon is \_\_\_\_\_ proportional to its frequency.

Answer: <https://biology-forums.com/index.php?topic=1899194>

### Question 1283

On a 90 MHz spectrometer, calculate the frequency at which a proton absorbs if it appears at 4.20 ppm.

Answer: <https://biology-forums.com/index.php?topic=1899324>

### Question 1284

Describe the major elimination products of the following reaction, including any stereochemistry, and indicate which structure will predominate. Explain and defend your answer.

Answer: <https://biology-forums.com/index.php?topic=1898003>

### Question 1285

Given that compound X has a molecular formula of  $C_6H_{10}O_2$ , gave three peaks in its  $^{13}C$  NMR spectrum (14, 63 and 158 ppm) and two peaks in its  $^1H$  NMR spectrum (1.4, triplet and 4.3 ppm, quartet), provide a structure for compound X.

Answer: <https://biology-forums.com/index.php?topic=1899438>

### Question 1286

Draw the structure of the conjugate acid of acetone

Answer: <https://biology-forums.com/index.php?topic=1897213>

### Question 1287

Provide the name of the major organic product that results when 1-pentene is treated with aqueous acid.

Answer: <https://biology-forums.com/index.php?topic=1898345>

### Question 1288

Which of the following terms best describes the stereochemical relationship of the two compounds shown below in Fischer notation?

- enantiomers
- cis/trans - isomers
- meso - same structure
- constitutional isomers
- diastereomers

Answer: <https://biology-forums.com/index.php?topic=1897699>

### Question 1289

In the presence of a small amount of bromine, the following light-promoted reaction has been observed. Write a mechanism for this reaction, making sure to explain how both products are formed.

Answer: <https://biology-forums.com/index.php?topic=1897482>

### Question 1290

Draw an acceptable structure for (Z)-2-chloro-4-ethylhex-2-ene.

Answer: <https://biology-forums.com/index.php?topic=1897938>

### Question 1291

An optically active D-aldopentose produced an optically inactive aldaric acid upon treatment with  $HNO_3$ . When this aldopentose was subjected to a Ruff degradation, a D-aldotetrose was generated. This aldotetrose gave an optically inactive alditol upon reduction with  $NaBH_4$ . Use these data to provide the structure of the starting D-aldopentose.

Answer: <https://biology-forums.com/index.php?topic=1899929>

### Question 1292

Which of the following is also known as a Schiff base?

- an aldehyde
- a hydrate
- an imine
- sodium hydroxide
- a cyanohydrin

Answer: <https://biology-forums.com/index.php?topic=1898698>

### Question 1293

Which of the following are acceptable Lewis structures, including formal charges, for nitric acid,  $HNO_3$ ?

- A only
- B only
- C only
- both B and C
- A, B, and C

Answer: <https://biology-forums.com/index.php?topic=1897175>

### Question 1294

Which of the terms below best describes biodiesel?

- fatty ester of methanol
- triglyceride
- wax
- fatty acid

Answer: <https://biology-forums.com/index.php?topic=1900097>

### Question 1295

Provide the structure of the major organic product which results when L-phenylalanine is treated with a large excess of PhCH<sub>2</sub>OH and gaseous HCl.

Answer: <https://biology-forums.com/index.php?topic=1900033>

### Question 1296

\_\_\_\_\_ is similar to furan, with a sulfur atom in place of the oxygen.

Answer: <https://biology-forums.com/index.php?topic=1899762>

### Question 1297

Which of the following are acceptable Fischer projections for S-alanine, NH<sub>2</sub>CH(CH<sub>3</sub>)COOH?

- I only
- II only
- III only
- I and III

Answer: <https://biology-forums.com/index.php?topic=1897735>

### Question 1298

Which of the following compound(s), when reacted with aniline, yield(s) acetanilide?

- acetyl chloride
- acetic anhydride
- methyl butanoate
- both A and B
- both A and C

Answer: <https://biology-forums.com/index.php?topic=1899057>

### Question 1299

Predict the molecular formula of 4-ethyl-5,5-dimethyldodecane.

Answer: <https://biology-forums.com/index.php?topic=1897366>

### Question 1300

Provide the structure of the major organic product which results when phenanthrene is treated with Br<sub>2</sub> in carbon tetrachloride.

Answer: <https://biology-forums.com/index.php?topic=1899781>

### Question 1301

The flame retardant below has been found to be an androgen agonist and may have a contribution to an increasing rate of occurrence of prostate cancer (J. Med. Chem. 2006, 7366). What is the correct term that describes the relative position of the bromides in this structure?

- aryl
- vinyl
- vicinal
- geminal

Answer: <https://biology-forums.com/index.php?topic=1897750>

### Question 1302

What reagent is used to convert pentanamide to 1-pentanamine?

- POCl<sub>3</sub>
- SOCl<sub>2</sub>
- CuCN
- CH<sub>3</sub>MgBr
- LiAlH<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1899061>



### Question 1303

Devise an efficient method for preparing 4-bromobenzonitrile from benzene.

Answer: <https://biology-forums.com/index.php?topic=1898834>

### Question 1304

Label each asymmetric carbon in the compound below as R or S.

Answer: <https://biology-forums.com/index.php?topic=1897655>

### Question 1305

Dehydration of an unknown alcohol with concentrated H<sub>2</sub>SO<sub>4</sub> results in the formation of all of the following alkene products. What is/are the possible structures of the original alcohol?

- 
- 
- 
- 

• Both B and C are possible structures for the original alcohol.

Answer: <https://biology-forums.com/index.php?topic=1898009>

### Question 1306

The following structure is a proteasome inhibitor that may find application in treating cervical cancer (J. Med. Chem. 2011, 449). The halides in this structure may be classified as \_\_\_\_\_ and \_\_\_\_\_.

- vinyl; geminal
- vicinal; aryl
- vinyl; aryl
- vicinal; vinyl

Answer: <https://biology-forums.com/index.php?topic=1897768>

### Question 1307

Shown below is a segment of polypropylene. Which of the following terms describes the stereochemistry of the methyl substituents?

- peritactic
- tacky
- syndiotactic
- atactic
- isotactic

Answer: <https://biology-forums.com/index.php?topic=1900271>

### Question 1308

The following substrate is a starting material in the synthesis of compounds having opiod activity (J. Med. Chem. 2011, 957). Show all products that would result from the reaction below.

Answer: <https://biology-forums.com/index.php?topic=1898823>

### Question 1309

By which single reaction can benzene be readily converted into acetophenone?

Answer: <https://biology-forums.com/index.php?topic=1898665>

### Question 1310

Which of the following is the same as the tropylium ion?

- cycloheptatrienyl anion
- cyclopentadienyl anion
- cyclopropenyl anion
- cycloheptatrienyl cation
- cyclopentadienyl cation

Answer: <https://biology-forums.com/index.php?topic=1899738>

### Question 1311

When a ketone is treated with  $\text{LiAlH}_4$  followed by addition of  $\text{H}_2\text{O}$ , what general class of product results?

- aldehyde
- ether
- primary alcohol
- tertiary alcohol
- secondary alcohol

Answer: <https://biology-forums.com/index.php?topic=1898394>

### Question 1312

Convert the Newman structure below to the equivalent line-angle structure.

Answer: <https://biology-forums.com/index.php?topic=1897414>

### Question 1313

Which of the following is another accepted name for methyl phenyl ketone?

- acetophenone
- anisole
- benzophenone
- cresol
- cresone

Answer: <https://biology-forums.com/index.php?topic=1899794>

### Question 1314

When an aldehyde is reacted with  $\text{HCN}$  in the presence of  $\text{KCN}$ , what product is formed?

- oxime
- acetal
- hydrate
- cyanohydrin

Answer: <https://biology-forums.com/index.php?topic=1898716>

### Question 1315

Which of the following is an incorrect statement about the bromination of benzene by  $\text{Br}_2$  and  $\text{FeBr}_3$ ?

- The final step of the mechanism is loss of  $\text{H}^+$ .
- The carbanionic intermediate is resonance stabilized.
- Formation of the sigma complex is the rate-determining step of the mechanism.
- $\text{FeBr}_3$  functions to increase the electrophilicity of  $\text{Br}_2$ .
- There is one carbon-containing intermediates in the mechanism.

Answer: <https://biology-forums.com/index.php?topic=1898533>

### Question 1316

Why are ether solvents used in the preparation of Grignard and organolithium reagents?

Answer: <https://biology-forums.com/index.php?topic=1898358>

### Question 1317

Dehydrohalogenation of 2-bromobutane in the presence of a strong base proceeds via which of the following mechanistic pathways?

- $\text{SN}_2$
- $\text{E}_1$
- $\text{E}_2$
- $\text{SN}_1$
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897971>

### Question 1318

Arrange the following compounds in order of increasing reactivity toward ethanol solvolysis:

t-butyl bromide, t-butyl iodide, isopropyl chloride, methyl iodide.

Answer: <https://biology-forums.com/index.php?topic=1897819>

### Question 1319

What substance results from the 1,4-polymerization of 1,3-butadiene?

Answer: <https://biology-forums.com/index.php?topic=1900279>

### Question 1320

Given the following heats of combustion per CH<sub>2</sub> group within the structure, which cyclic alkane has essentially no angle strain? (Ref: long-chain Alkane = 659 kJ/mol)

- cyclobutane = 686 kJ/mol
- cyclooctane = 663 kJ/mol
- cyclopentane = 664 kJ/mol
- cyclohexane = 659 kJ/mol
- cycloheptane = 662 kJ/mol

Answer: <https://biology-forums.com/index.php?topic=1897434>

### Question 1321

Which of the following structural features is not typically found in a prostaglandin?

- an amino group
- a 5-membered ring
- a carboxyl group
- a hydroxyl group
- a carbon-carbon double bond

Answer: <https://biology-forums.com/index.php?topic=1900195>

### Question 1322

What are copolymers?

Answer: <https://biology-forums.com/index.php?topic=1900281>

### Question 1323

Use a sawhorse structure to depict the eclipsed conformer of ethane.

Answer: <https://biology-forums.com/index.php?topic=1897411>

### Question 1324

Which of the following alkyl halides can produce only a single alkene product from when treated with sodium methoxide?

- 3-chloro-3-ethylpentane
- 2-chloro-4-methylpentane
- 3-chloro-2-methylpentane
- 2-chloro-3-ethylpentane
- 2-chloro-2-methylpentane

Answer: <https://biology-forums.com/index.php?topic=1897849>

### Question 1325

Provide a detailed, stepwise mechanism for the formation of acetate and bromodiiodomethane from bromoacetone, hydroxide and iodine.

Answer: <https://biology-forums.com/index.php?topic=1899118>

### Question 1326

Provide the structure of the product that results when ethyl acetoacetate is subjected to the following sequence: 1. NaOCH<sub>2</sub>CH<sub>3</sub>. CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>I<sub>3</sub>. H<sub>3</sub>O<sup>+</sup>, heat.

Answer: <https://biology-forums.com/index.php?topic=1899176>

### Question 1327

Draw the structure of poly(tetrafluoroethylene) or Teflon.

Answer: <https://biology-forums.com/index.php?topic=1897941>

### Question 1328

Draw the structure of N-propyl-4-methyl-3-octanamine.

Answer: <https://biology-forums.com/index.php?topic=1898747>

### Question 1329

Name the major product which results when HBr is added to 3-ethyl-3-hexene.

Answer: <https://biology-forums.com/index.php?topic=1898024>

### Question 1330

When (cis)-1-bromo-2 methylcyclohexane is treated with methanol and heat, four different products are formed — two by substitution and two by elimination.

Which of the following conditions would change the outcome of this reaction by promoting the production of 3-methylhexene as the major product?

- tert-butyl alcohol and heat
- KOH, ethanol and heat
- methoxide/methanol
- water/acetone and heat
- tert-butoxide/tert-butyl alcohol

Answer: <https://biology-forums.com/index.php?topic=1897865>

### Question 1331

How many elements of unsaturation are implied by the molecular formula C<sub>5</sub>H<sub>8</sub>O

- 0
- 1
- 2
- 3
- 4

[html]How many elements of unsaturation are implied by the molecular formula C<sub>6</sub>H<sub>12</sub>[/html]

- 0
- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1897901>

### Question 1332

What reactive species is produced in the initiation step of the free radical chlorination of 2,2-dimethylpropane?

- a carbocation
- a chlorine atom
- a chlorine radical anion
- a carbon radical

Answer: <https://biology-forums.com/index.php?topic=1897525>

### Question 1333

Provide a structural representation of cis-3-ethyl-1,2-epoxycyclopentane.

Answer: <https://biology-forums.com/index.php?topic=1899498>

### Question 1334

Anthocyanidins are the organic compounds largely responsible for the color of wine and grape juice. They can also be used as indicators in pH titrations. Given the reaction below, which form of the compound is colored and which is colorless.

Answer: <https://biology-forums.com/index.php?topic=1899675>

### Question 1335

Vildagliptin is a recently released antidiabetic drug (J. Med. Chem. 2010, 7902). Circle and name each functional group in vildagliptin.

Answer: <https://biology-forums.com/index.php?topic=1897329>

### Question 1336

The Hofmann elimination proceeds via a(n) \_\_\_\_\_ pathway.

- SN<sub>2</sub>
- E<sub>2</sub>
- E<sub>1</sub>
- SN<sub>1</sub>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898818>

### Question 1337

Consider the four substituents below. Order them in decreasing priority according to the Cahn-Ingold-Prelog priority system. (Highest priority is first, lowest is last.)

-CHCH<sub>2</sub>, -C(CH<sub>3</sub>)<sub>3</sub>, -CH<sub>2</sub>OH, -COOH

Answer: <https://biology-forums.com/index.php?topic=1897634>

### Question 1338

The nitrogen atom of trimethylamine is \_\_\_\_\_ hybridized which is reflected in the CNC bond angle of \_\_\_\_\_.

- sp<sup>2</sup>; 120°
- sp; 180°
- sp<sup>2</sup>; 108°
- sp<sup>3</sup>; 120°
- sp<sup>3</sup>; 108°

Answer: <https://biology-forums.com/index.php?topic=1898761>

### Question 1339

Which of the following does not contain a carbonyl group?

- ether
- aldehyde
- ester
- carboxylic acid
- ketone

Answer: <https://biology-forums.com/index.php?topic=1897316>

### Question 1340

What two organic compounds result when 3-heptyne is treated with ozone followed by hydrolysis?

Answer: <https://biology-forums.com/index.php?topic=1898285>

### Question 1341

Provide a synthesis of the compound shown below from cyclopent-2-en-1-one and acetoacetic ester.

Answer: <https://biology-forums.com/index.php?topic=1899177>

### Question 1342

Which region of the electromagnetic spectrum, IR or X-ray, is characterized by waves of lower frequency?

Answer: <https://biology-forums.com/index.php?topic=1899208>

### Question 1343

For the structure shown below, draw the stereoisomer having a configuration of (1R,3S,4S) in a perspective structure.

Answer: <https://biology-forums.com/index.php?topic=1897666>

### Question 1344

Even though we often write the structure of glycine as NH<sub>2</sub>CHCOOH, why does this not accurately represent the structure of the amino acid?

Answer: <https://biology-forums.com/index.php?topic=1900016>

### Question 1345

What series of synthetic steps could be used to prepare 1-methylcyclohexanol from cyclohexene?

Answer: <https://biology-forums.com/index.php?topic=1898444>

### Question 1346

Consider the reaction energy diagram shown below. Label the axes.

- Which points on the curve indicate transition states? Label them with A, B, etc.
- Is the overall reaction exothermic or endothermic?

Answer: <https://biology-forums.com/index.php?topic=1897543>

### Question 1347

Nitroamines are common functional groups found in energetic materials, such as RDX and HMX. For the structure below, draw two other significant resonance structures, include any formal charges, and indicate the hybridization on each nitrogen and oxygen.

Answer: <https://biology-forums.com/index.php?topic=1897183>

### Question 1348

Describe the molecular ion region in the mass spectrum of CH<sub>3</sub>CH<sub>2</sub>Br.

Answer: <https://biology-forums.com/index.php?topic=1899305>

### Question 1349

What C<sub>5</sub>H<sub>12</sub> isomer will give only a single monochlorination product?

Answer: <https://biology-forums.com/index.php?topic=1897560>

### Question 1350

Arrange the following in order of increasing basicity:

aniline, p-nitroaniline, p-toluidine, and p-methoxyaniline.

Answer: <https://biology-forums.com/index.php?topic=1898769>

### Question 1351

When an alkene is subjected to treatment with Hg(OAc)<sub>2</sub> in alcohol followed by reaction with NaBH<sub>4</sub>, what new class of compound is formed?

- epoxide
- ether
- syn diol
- alkane
- alkyne

Answer: <https://biology-forums.com/index.php?topic=1898063>

### Question 1352

What is the result of reaction involving D-glyceraldehyde and NaBH<sub>4</sub>?

- glycerol
- dihydroxyacetone
- ethanol and CO<sub>2</sub>
- glyceric acid
- propane

Answer: <https://biology-forums.com/index.php?topic=1899894>

### Question 1353

In the lowest energy conformation of the compound below, how many alkyl substituents are equatorial?

- 3
- 6
- 1
- 0
- 2

Answer: <https://biology-forums.com/index.php?topic=1897451>

### Question 1354

Acetone is a ketone that contains three carbon atoms. Provide its structure.

Answer: <https://biology-forums.com/index.php?topic=1897321>

### Question 1355

What series of synthetic steps could be used to carry out the transformation shown below?

Answer: <https://biology-forums.com/index.php?topic=1898442>

### Question 1356

Cyclic esters are called \_\_\_\_\_.

- imides
- lactams
- enamines
- lacrimals
- lactones

Answer: <https://biology-forums.com/index.php?topic=1898963>

### Question 1357

In the bromination of benzene using Br<sub>2</sub> and FeBr<sub>3</sub>, is the intermediate carbocation aromatic? Explain.

Answer: <https://biology-forums.com/index.php?topic=1898530>

### Question 1358

Which of the following functional groups has the most deshielded proton and would be predicted to show an NMR signal that is the farthest downfield?

- acetylenic - H
- aromatic - H
- aldehyde - H
- benzylic - H
- allylic - H

Answer: <https://biology-forums.com/index.php?topic=1899321>

### Question 1359

Provide the structure of each monomer unit used in the formation of the following polymer.

Answer: <https://biology-forums.com/index.php?topic=1900323>

### Question 1360

Acetals will react with \_\_\_\_\_.

- CH<sub>3</sub>CH<sub>2</sub>MgBr
- PhLi
- NaBH<sub>4</sub>
- NaOCH<sub>3</sub>
- H<sub>3</sub>O<sup>+</sup>

Answer: <https://biology-forums.com/index.php?topic=1898711>

### Question 1361

The following natural product has been examined for cytotoxic activity. How should this natural product be classified?

- monoterpene
- diterpene
- triterpene
- sesquiterpene

Answer: <https://biology-forums.com/index.php?topic=1900203>

### Question 1362

\_\_\_\_\_, also known as wood alcohol, is used as a fuel and as a solvent. Ingestion of this alcohol can lead to blindness and death.

Answer: <https://biology-forums.com/index.php?topic=1898294>

### Question 1363

Draw the three-dimensional structure of chloroform (CHCl<sub>3</sub>) and show the direction of the molecular dipole moment.

Answer: <https://biology-forums.com/index.php?topic=1897290>

### Question 1364

Which of the following describes a synthesis of an aldehyde?

- reaction of a ketone with ozone
- hydrogenation of an acid chloride using Pd/BaSO<sub>4</sub>/S as a poisoned catalyst
- treatment of an alkene with Sia<sub>2</sub>BH
- reaction of a primary alcohol with Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898674>

### Question 1365

Consider the bond dissociation energies listed below in kcal/mol.

$\text{CH}_3\text{-Br}$  70  $\text{CH}_3\text{CH}_2\text{-Br}$  68  $(\text{CH}_3)_2\text{CH-Br}$  68  $(\text{CH}_3)_3\text{C-Br}$  65

These data show that the carbon-bromine bond is weakest when bromine is bound to a \_\_\_\_\_.

- tertiary carbon
- secondary carbon
- primary carbon
- methyl carbon
- quaternary carbon

Answer: <https://biology-forums.com/index.php?topic=1897531>

### Question 1366

What are the four common ribonucleosides?

Answer: <https://biology-forums.com/index.php?topic=1899947>

### Question 1367

Provide the structure of 4,4-dimethylpyran.

Answer: <https://biology-forums.com/index.php?topic=1899494>

### Question 1368

Which of the following is least readily formed by cationic polymerization?

- poly(propylene)
- polystyrene
- poly(isobutylene)
- poly(acrylonitrile)
- All of the above have equal propensity to undergo cationic polymerization.

Answer: <https://biology-forums.com/index.php?topic=1900241>

### Question 1369

A sample of cyclohexylamine is contaminated with considerable hydrocarbon impurity. How might the sample be purified using a technique based on solubility differences?

Answer: <https://biology-forums.com/index.php?topic=1898783>

### Question 1370

Rank the following compounds in order of increasing reactivity in an  $\text{S}_\text{N}2$  reaction. (Fastest is first, slowest is last.)

- IV > II > III > I
- IV > II > I > III
- II > IV > I > III
- III > I > II > IV

Answer: <https://biology-forums.com/index.php?topic=1897883>

### Question 1371

Which of the following reactions involves the formation of a methyl ester from a carboxylic acid?

- Cope elimination
- Hunsdiecker reaction
- Hell-Volhard-Zelinsky reaction
- hydroboration with diborane
- reaction with  $\text{CH}_2\text{N}_2$

Answer: <https://biology-forums.com/index.php?topic=1898936>

### Question 1372

Which amino acid has a phenol in its side chain?

- tyrosine
- tryptophan
- isoleucine
- asparagine
- histidine

Answer: <https://biology-forums.com/index.php?topic=1899966>



### Question 1373

The structure of cellulose is shown below. What type of polymer is it?

- Chain-growth polymer
- Step-growth polymer
- Ziegler-Natta polymer
- Alternating copolymer

Answer: <https://biology-forums.com/index.php?topic=1900269>

### Question 1374

Provide the structure of Teflon.

Answer: <https://biology-forums.com/index.php?topic=1900229>

### Question 1375

The following structure was used in the synthesis of a complex natural product shown to have cytotoxic activity (Org. Lett. 2006, 5585). Show how this structure may be constructed by a Robinson annulation by indicating the necessary starting materials.

Answer: <https://biology-forums.com/index.php?topic=1899183>

### Question 1376

Poly (vinyl acetate) is used in the backing of carpet, and in paints and adhesives. Provide two repeating units of poly (vinyl acetate).

Answer: <https://biology-forums.com/index.php?topic=1900230>

### Question 1377

Which of the following is a primary alkyl halide?

- isobutyl chloride
- methyl bromide
- cyclohexyl bromide
- isopropyl bromide
- t-butyl iodide

Answer: <https://biology-forums.com/index.php?topic=1897763>

### Question 1378

What spectroscopic technique can be used to determine the molecular formula of a compound?

Answer: <https://biology-forums.com/index.php?topic=1899299>

### Question 1379

Typically, amides will hydrolyze under \_\_\_\_\_ conditions than esters.

- less vigorous
- stronger
- milder
- more saline
- more dilute

Answer: <https://biology-forums.com/index.php?topic=1899021>

### Question 1380

What compound results when 1-butanol is treated with P/I<sub>2</sub>?

- racemic CH<sub>3</sub>CH<sub>2</sub>CHICH<sub>3</sub>
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>OP(OH)<sub>2</sub>
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>I
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>PI<sub>2</sub>
- Primary alcohols don't react with P/I<sub>2</sub>.

Answer: <https://biology-forums.com/index.php?topic=1898471>

### Question 1381

When a disulfide linkage is formed, the compound containing this new linkage has been \_\_\_\_\_.

- oxidized
- hydrolyzed
- electrolyzed

- dehydrated
- reduced

Answer: <https://biology-forums.com/index.php?topic=1900050>

### Question 1382

What intermolecular attractions exist in a pure sample of methylthiol, CH<sub>3</sub>SH?

Answer: <https://biology-forums.com/index.php?topic=1897297>

### Question 1383

Draw a full and complete mechanism to account for the formation of the product in the reaction shown below.

Answer: <https://biology-forums.com/index.php?topic=1898036>

### Question 1384

Name two of the three predominant groups of simple lipids.

Answer: <https://biology-forums.com/index.php?topic=1900092>

### Question 1385

Provide the structure of the conjugate acid of ethanamine (CH<sub>3</sub>CH<sub>2</sub>NH<sub>2</sub>)

Answer: <https://biology-forums.com/index.php?topic=1897212>

### Question 1386

Why can methyl acrylate (H<sub>2</sub>C=CHCO<sub>2</sub>CH<sub>3</sub>) be polymerized through anionic polymerization?

Answer: <https://biology-forums.com/index.php?topic=1898133>

### Question 1387

When toluene is treated with bromine (shown below), the bromine doesn't react with the double bond to form a vicinal dihalide, but instead a substitution of one of the benzylic hydrogens takes place. Why?

Answer: <https://biology-forums.com/index.php?topic=1899708>

### Question 1388

The structure of Taxol, a potent chemotherapeutic, is shown below. In the structure, there are \_\_\_\_\_ ketones and \_\_\_\_\_ aldehydes.

- 1 ketone; 0 aldehydes
- 1 ketone; 1 aldehyde
- 5 ketones; 1 aldehyde
- 0 ketones; 0 aldehydes
- 6 ketones; 0 aldehydes

Answer: <https://biology-forums.com/index.php?topic=1898625>

### Question 1389

Which of the alkyne addition reactions below involve(s) an enol intermediate?

- hydroboration/oxidation
- treatment with HgSO<sub>4</sub> in dilute H<sub>2</sub>SO<sub>4</sub>
- hydrogenation
- both A and B
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898255>

### Question 1390

Could pentane and heptane easily be distinguished by IR spectroscopy?

Answer: <https://biology-forums.com/index.php?topic=1899221>

### Question 1391

Which series of reagents would be required to perform the following synthesis?

- 1. ClCOCH<sub>2</sub>CH<sub>3</sub>, AlCl<sub>3</sub>. FeBr<sub>3</sub>, Br<sub>2</sub>. Zn(Hg), HCl
- 1. ClCOCH<sub>2</sub>CH<sub>3</sub>, AlCl<sub>3</sub>. FeBr<sub>3</sub>, Br<sub>2</sub>
- 1. ClCOCH<sub>2</sub>CH<sub>3</sub>, AlCl<sub>3</sub>. Zn(Hg), HCl. FeBr<sub>3</sub>, Br<sub>2</sub>

• 1.  $\text{ClCH}_2\text{CH}_2\text{CH}_3$ ,  $\text{AlCl}_3$ ,  $\text{FeBr}_3$ ,  $\text{Br}_2$

Answer: <https://biology-forums.com/index.php?topic=1898594>

### Question 1392

Draw two major resonance forms of the cation which results when cyclohexanone's carbonyl group is protonated.

Answer: <https://biology-forums.com/index.php?topic=1898682>

### Question 1393

Which of the following reagents can be used to convert disulfide bridges into cysteic acid residues?

- $\text{PhNCS}$
- $\text{HCO}_3\text{H}$
- $\text{PhCH}_2\text{OCOCI}$
- $\text{Zn}$ ,  $\text{HCl}$
- $\text{CH}_3\text{I}$

Answer: <https://biology-forums.com/index.php?topic=1899984>

### Question 1394

Provide the structure of an aromatic compound with seven carbon atoms.

Answer: <https://biology-forums.com/index.php?topic=1897311>

### Question 1395

Treatment of a monosaccharide with silver oxide and excess methyl iodide will \_\_\_\_\_.

- methylate only the hydroxyl at C1
- cleave the sugar between C5 and C6
- methylate all hydroxyl groups present
- cleave the sugar between C1 and C6
- form the disaccharide

Answer: <https://biology-forums.com/index.php?topic=1899918>

### Question 1396

Which of the following is an incorrect description of benzene?

- The CCC bond angles are all equal to  $120^\circ$ .
- The molecule is a 6-membered ring which contains alternating single and double carbon-carbon bonds.
- The molecule can be drawn as a resonance hybrid of two Kekule structures.
- The molecule is aromatic.
- The molecule is planar.

Answer: <https://biology-forums.com/index.php?topic=1899704>

### Question 1397

Provide a structural representation of 1,2-epoxybutane (also called 2-ethyloxirane).

Answer: <https://biology-forums.com/index.php?topic=1899490>

### Question 1398

In the complete combustion of heptane, how many moles of water are produced?

Answer: <https://biology-forums.com/index.php?topic=1897402>

### Question 1399

Provide the structure of the diethyl acetal of butanal.

Answer: <https://biology-forums.com/index.php?topic=1898713>

### Question 1400

The hydrogen atom abstraction step in the free radical bromination of methane is endothermic. Use the Hammond Postulate to speculate on the extent of bond formation and bond cleavage in the transition state.

Answer: <https://biology-forums.com/index.php?topic=1897586>

### Question 1401

Which of the following is not a fused-ring heterocycle?

- quinoline

- purine
- indole
- pyrimidine
- benzofuran

Answer: <https://biology-forums.com/index.php?topic=1899786>

### Question 1402

Which of the statements below correctly describes an achiral molecule?

- The molecule has an enantiomer.
- The molecule has a nonsuperimposable mirror image.
- The molecule exhibits optical activity when it interacts with plane-polarized light.
- The molecule might be a meso form.
- None of the above

Answer: <https://biology-forums.com/index.php?topic=1897629>

### Question 1403

Rank the following compounds in order of increasing basicity:  $\text{CH}_3\text{O}^-$ ,  $\text{H}_2\text{N}^-$ ,  $\text{H}_2\text{O}$ , and  $\text{NH}_3$ .

Answer: <https://biology-forums.com/index.php?topic=1897135>

### Question 1404

Which of the following reactive intermediate species maintains  $\text{sp}^3$  hybridization?

- methyl carbanion
- dibromocarbene
- tertiary carbocation
- secondary alkyl radical
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1897592>

### Question 1405

Draw the highest energy transition state in the solvolysis of  $(\text{CH}_3)_3\text{CCl}$  in  $\text{CH}_3\text{OH}$ .

Answer: <https://biology-forums.com/index.php?topic=1897823>

### Question 1406

When Br radical reacts with 1-butene ( $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ ), the hydrogen atom which is preferentially abstracted is the one which produces a resonance stabilized radical. Draw the major resonance contributing forms of this radical.

Answer: <https://biology-forums.com/index.php?topic=1897596>

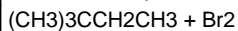
### Question 1407

Draw a mechanism and use a chair structure to explain the major product that is formed in the reaction below.

Answer: <https://biology-forums.com/index.php?topic=1897982>

### Question 1408

Predict the major monobromination product in the following reaction.



Answer: <https://biology-forums.com/index.php?topic=1897566>

### Question 1409

Describe a sequence of reactions by which racemic 2,3-dibromobutane can be straightforwardly prepared from propyne.

Answer: <https://biology-forums.com/index.php?topic=1898268>

### Question 1410

Low-density polyethylene is soft and flimsy because it has a \_\_\_\_\_ and \_\_\_\_\_ structure.

- unbranched; crystalline
- highly branched; amorphous
- highly branched; crystalline
- unbranched; triglyceride
- unbranched; amorphous

Answer: <https://biology-forums.com/index.php?topic=1900333>

### Question 1411

Provide a structure of the tripeptide YAP.

Answer: <https://biology-forums.com/index.php?topic=1900048>

### Question 1412

Which of the following structures (a-d) is another resonance structure of the following organic molecule?

Answer: <https://biology-forums.com/index.php?topic=1897178>

### Question 1413

The wavelength and frequency of a given wave of electromagnetic radiation are \_\_\_\_\_ proportional.

Answer: <https://biology-forums.com/index.php?topic=1899205>

### Question 1414

The structure of Tamiflu, an antiinfluenza drug, is shown below (Organic Lett. 2007, 259). Circle and identify each functional group in Tamiflu.

Answer: <https://biology-forums.com/index.php?topic=1897331>

### Question 1415

Assuming a chair conformation, which of the following configurations will always have both methyl groups in relative axial/equatorial positions?

- trans-1,3-dimethylcyclohexane
- trans-1,2-dimethylcyclohexane
- cis-1,2-dimethylcyclohexane
- cis-1,3-dimethylcyclohexane
- Both B and D are correct.
- Both A and C are correct.

Answer: <https://biology-forums.com/index.php?topic=1897453>

### Question 1416

Which has the higher boiling point, butan-1-ol or 1-butanamine? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1898770>

### Question 1417

Atoms with the same number of protons but different numbers of neutrons are called \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897096>

### Question 1418

Draw an acceptable structure for 3-ethyl-3-methylhexane.

Answer: <https://biology-forums.com/index.php?topic=1897356>

### Question 1419

Anisole is known by two other names. Give either of them.

Answer: <https://biology-forums.com/index.php?topic=1899486>

### Question 1420

List the criteria which compounds must meet in order to be considered aromatic.

Answer: <https://biology-forums.com/index.php?topic=1899728>

### Question 1421

Given that tertiary H atoms react with a chlorine radical about 5.5 times faster than primary ones, estimate the ratio of the two monochlorinated products that result when 2,3-dimethylbutane undergoes free radical chlorination.

Answer: <https://biology-forums.com/index.php?topic=1897577>

### Question 1422

Which of the following statements describe a favorable attribute of a leaving group? (More than one answer is possible.)

- The departed leaving group should have low basicity.

- The leaving group should be highly polarizable.
- The lower the electronegativity of the leaving group the better.
- Good leaving groups need to have low steric hindrance.

Answer: <https://biology-forums.com/index.php?topic=1897808>

### Question 1423

Which of the following represents a pair of epimers?

- D- and L-erythrose
- D-erythrose and D-threose
- D-arabinose and D-erythrose
- D-glyceraldehyde and D-threose
- D-arabinose and D-xylose

Answer: <https://biology-forums.com/index.php?topic=1899861>

### Question 1424

What is the carbon : hydrogen mole ratio in polyethylene?

- 1:2
- 12:1
- 3:2
- 1:100
- 1:3

Answer: <https://biology-forums.com/index.php?topic=1900218>

### Question 1425

Provide a series of synthetic steps by which 4-t-butylbenzoic acid can be prepared from toluene.

Answer: <https://biology-forums.com/index.php?topic=1898614>

### Question 1426

How might one prepare 4-heptanone from  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CN}$  in two steps?

Answer: <https://biology-forums.com/index.php?topic=1898671>

### Question 1427

Star the chirality centers in the molecule below.

Answer: <https://biology-forums.com/index.php?topic=1897644>

### Question 1428

What type of polymer uses phosgene as one of its monomer components?

- polycarbonates
- polyamides
- polyurethanes
- polyesters
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900305>

### Question 1429

Account for fragments having a m/z value of 45 and 55 in the mass spectrum of 2-hexanol by drawing structures of the fragments.

Answer: <https://biology-forums.com/index.php?topic=1899311>

### Question 1430

Neoprene is a flexible, chemically resistant polymer used in shoe soles, hoses and wetsuits. Based on the polymer structure of neoprene, provide a structure for the monomer of neoprene.

Answer: <https://biology-forums.com/index.php?topic=1900253>

### Question 1431

Starting from 1-bromopropane, how could you make propan-1-amine?

- 1.  $\text{CH}_3\text{COCl}$  2.  $\text{LiAlH}_4$  3.  $\text{H}_2\text{O}$
- 1.  $\text{NaCN}$  2.  $\text{H}_2/\text{Pd}$

• 1. phthalamide anion 2. N<sub>2</sub>H<sub>4</sub>, heat

• All methods would work.

Answer: <https://biology-forums.com/index.php?topic=1898827>

### Question 1432

Describe a sequence of reactions by which (E)-5-bromopent-2-ene can be straightforwardly prepared from propyne.

Answer: <https://biology-forums.com/index.php?topic=1898242>

### Question 1433

Polymers composed of identical monomer units are known as \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1900280>

### Question 1434

Which of the indicated carbon-carbon bonds is shorter?

Answer: <https://biology-forums.com/index.php?topic=1897891>

### Question 1435

What type of polymer is formed by the transesterification of dimethyl terephthalate with 1,4-di(hydroxymethyl)cyclohexane?

- polyurethane
- polyethylene
- polyester
- polyamide
- polycarbonate

Answer: <https://biology-forums.com/index.php?topic=1900307>

### Question 1436

Arrange the following compounds in order of increasing boiling point: acetic acid, propanenitrile, butane, and acetamide.

Answer: <https://biology-forums.com/index.php?topic=1898993>

### Question 1437

3-Methylpentane can be dehydrogenated to form an alkene with molecular formula of C<sub>6</sub>H<sub>12</sub>. What is the most stable alkene that could be formed?

Name it with the appropriate stereochemical designator.

Answer: <https://biology-forums.com/index.php?topic=1897965>

### Question 1438

Which of the following terms best describes the compound below?

CH<sub>3</sub>(CH<sub>2</sub>)<sub>4</sub>CHCH<sub>2</sub>CHCH(CH<sub>2</sub>)<sub>7</sub>CO<sub>2</sub>-Na<sup>+</sup>

- a wax
- a lecithin
- a prostaglandin
- a soap
- a terpene

Answer: <https://biology-forums.com/index.php?topic=1900155>

### Question 1439

Draw 2 possible Lewis structures for the compound with molecular formula C<sub>3</sub>H<sub>6</sub>.

Answer: <https://biology-forums.com/index.php?topic=1897168>

### Question 1440

Show how you could convert benzene to benzoic acid.

Answer: <https://biology-forums.com/index.php?topic=1898911>

### Question 1441

\_\_\_\_\_ is produced when 1 equivalent of HBr is added to hex-1-yne in the presence of peroxides.

- E-1-Bromohex-1-ene
- E-2-Bromohex-2-ene
- 2-Bromohex-1-ene

- A mixture of E and Z isomers of 1-bromohex-1-ene
- Z-1-Bromohex-1-ene

Answer: <https://biology-forums.com/index.php?topic=1898254>

### Question 1442

When the reaction between methane and chlorine is photochemically initiated, which of the following compounds cannot be formed through a termination reaction?

- Cl<sub>2</sub>
- CH<sub>3</sub>Cl
- HCl
- CH<sub>3</sub>CH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1897492>

### Question 1443

Which step in an electrophilic aromatic substitution reaction is typically rate determining, formation of the sigma complex or loss of H<sup>+</sup> by the sigma complex to form the product? Explain.

Answer: <https://biology-forums.com/index.php?topic=1898528>

### Question 1444

Describe a sequence of reactions by which hept-1-yne can be straightforwardly prepared from hept-1-ene.

Answer: <https://biology-forums.com/index.php?topic=1898245>

### Question 1445

What m/z characterizes a strong peak in the mass spectrum of cyclopentanol?

- 70
- 85
- 86
- 68
- 84

Answer: <https://biology-forums.com/index.php?topic=1899247>

### Question 1446

The common name for pentanedioic acid is \_\_\_\_\_.

- adipic acid
- pimelic acid
- glutaric acid
- oxalic acid
- succinic acid

Answer: <https://biology-forums.com/index.php?topic=1898865>

### Question 1447

Briefly describe how two enantiomers might be separated.

Answer: <https://biology-forums.com/index.php?topic=1897731>

### Question 1448

sec-Butylamine is the common name of what compound?

- 2-butanamine
- 1-butanamine
- N-methyl-1-propanamine
- N-methyl-2-propanamine
- N-ethylethanamine

Answer: <https://biology-forums.com/index.php?topic=1898737>

### Question 1449

According to the 1,3-butadiene structure below, which positions would be best to place methoxy groups to yield the most reactive dimethoxy-1,3-butadiene isomer in the Diels-Alder reaction?

- b and c
- a and c
- a and d



- a and f
- c and d

Answer: <https://biology-forums.com/index.php?topic=1899673>

### Question 1450

Provide the structure of L-valine at pH 12.0.

Answer: <https://biology-forums.com/index.php?topic=1899991>

### Question 1451

What name is given to nonvolatile liquids that dissolve in polymers and thus lower the attractions between the polymers' chains?

Answer: <https://biology-forums.com/index.php?topic=1900334>

### Question 1452

Provide the structure of o-chlorotoluene.

Answer: <https://biology-forums.com/index.php?topic=1899803>

### Question 1453

Give one reason why  $^{13}\text{C}$  NMR is less sensitive than  $^1\text{H}$  NMR.

Answer: <https://biology-forums.com/index.php?topic=1899361>

### Question 1454

Which of the compounds below undergoes solvolysis in aqueous ethanol most rapidly?

- methyl iodide
- isopropyl chloride
- 3-iodo-3-methylpentane
- 3-chloropentane
- cyclohexyl bromide

Answer: <https://biology-forums.com/index.php?topic=1897817>

### Question 1455

How many asymmetric carbons are present in the compound below?

Answer: <https://biology-forums.com/index.php?topic=1897647>

### Question 1456

Assign the correct formal charge to each nitrogen atom in the following Lewis structure. (All non-bonding electrons are included.)

Answer: <https://biology-forums.com/index.php?topic=1897171>

### Question 1457

Provide a detailed, stepwise mechanism for the acid-catalyzed condensation reaction between benzaldehyde and methylamine.

Answer: <https://biology-forums.com/index.php?topic=1898702>

### Question 1458

Provide the Fischer projection of the open-chain form of the aldonic acid which results when L-glucose is treated with bromine water.

Answer: <https://biology-forums.com/index.php?topic=1899905>

### Question 1459

Provide the name of the major organic product that results when cyclopentanol is treated with acetyl chloride.

Answer: <https://biology-forums.com/index.php?topic=1898504>

### Question 1460

What is the major organic product that results when 3-heptyne is subjected to excess hydrogen and a platinum catalyst?

- 2-heptyne
- (Z)-2-heptene
- (Z)-3-heptene
- (E)-3-heptene
- heptane

Answer: <https://biology-forums.com/index.php?topic=1898257>

### Question 1461

Show the acetone that is formed when 1,2,4,5-tetrahydroxybenzene reacts with 2 equivalents of acetone under acidic conditions.

Answer: <https://biology-forums.com/index.php?topic=1898732>

### Question 1462

Provide the structure of pent-3-ynoic acid.

Answer: <https://biology-forums.com/index.php?topic=1898861>

### Question 1463

Which amino acid has an imidazole ring in its side chain?

- tyrosine
- tryptophan
- isoleucine
- asparagine
- histidine

Answer: <https://biology-forums.com/index.php?topic=1899968>

### Question 1464

Give the structures of three examples of molecules that have a molecular formula of C<sub>6</sub>H<sub>8</sub>. One of the structures should have only one ring and one of the structures should have no rings.

Answer: <https://biology-forums.com/index.php?topic=1897902>

### Question 1465

Provide the structure of the monomer from which polystyrene is formed.

Answer: <https://biology-forums.com/index.php?topic=1900225>

### Question 1466

Draw the three major resonance structures of the sigma complex intermediate in the reaction of acetophenone with HNO<sub>3</sub>/H<sub>2</sub>SO<sub>4</sub> to yield o-nitroacetophenone. Circle the resonance form which is less stable than the other two.

Answer: <https://biology-forums.com/index.php?topic=1898564>

### Question 1467

What common names for 1,4-butanediamine and 1,5-pentanediamine are derived from their characteristic pungent odors?

Answer: <https://biology-forums.com/index.php?topic=1898772>

### Question 1468

Which of the following is a tertiary amine?

- 3-pentanamine
- N,N-dimethylaniline
- methylamine
- cyclohexylamine
- N-ethyl-1-propanamine

Answer: <https://biology-forums.com/index.php?topic=1898756>

### Question 1469

\_\_\_\_\_ is the study of reaction rates.

Answer: <https://biology-forums.com/index.php?topic=1897477>

### Question 1470

Draw isopropylcyclohexane in a chair conformation and then draw its ring flipped isomer. Label the substituent as either axial or equatorial. Indicate which of the conformers is more stable.

Answer: <https://biology-forums.com/index.php?topic=1897446>

### Question 1471

In the addition of hydrogen bromide to alkynes in the absence of peroxides, which of the following species is thought to be an intermediate?

- vinyl anion

- vinyl cation
- carbene
- vinyl radical
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898275>

### Question 1472

Label each asymmetric carbon in the compound below as R or S.

Answer: <https://biology-forums.com/index.php?topic=1897669>

### Question 1473

Arrange the following species in order of increasing nucleophilicity:  
CH<sub>3</sub>CH<sub>2</sub>S<sup>-</sup>, CH<sub>3</sub>CH<sub>2</sub>O<sup>-</sup>, (CH<sub>3</sub>)<sub>3</sub>CO<sup>-</sup>, (CH<sub>3</sub>)<sub>3</sub>COH.

Answer: <https://biology-forums.com/index.php?topic=1897792>

### Question 1474

Provide the major organic product that results when 2,2,4-trimethylpentane is subjected to free radical bromination.

Answer: <https://biology-forums.com/index.php?topic=1897565>

### Question 1475

Which of the following compounds is an E isomer?

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1897967>

### Question 1476

Provide the necessary reagents to convert propionic acid to alanine.

Answer: <https://biology-forums.com/index.php?topic=1900022>

### Question 1477

Propose a synthesis to convert 2-butanol to butane.

Answer: <https://biology-forums.com/index.php?topic=1897973>

### Question 1478

Which of the following is the strongest acid?

- chloroacetic acid
- acetic acid
- dichloroacetic acid
- trichloroacetic acid

Answer: <https://biology-forums.com/index.php?topic=1898879>

### Question 1479

Which undergoes dehydration using concentrated H<sub>2</sub>SO<sub>4</sub> faster, cyclopentanol or 1-methylcyclopentanol? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1898489>

### Question 1480

Which of the following reactions is favorable, in the direction indicated, under fairly "normal" laboratory conditions?

- 
- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1899008>

### Question 1481

Using any compound that contains a carbonyl as your starting material, how would you synthesize butan-2-ol?

Answer: <https://biology-forums.com/index.php?topic=1898413>

### Question 1482

Define the term conformation.

Answer: <https://biology-forums.com/index.php?topic=1897410>

### Question 1483

Suggest a sequence of synthetic steps through which phenylacetic acid can be prepared from toluene via phenylacetone nitrile.

Answer: <https://biology-forums.com/index.php?topic=1898929>

### Question 1484

Rank the species below in order of increasing nucleophilicity in hydroxylic solvents:

CH<sub>3</sub>CO<sub>2</sub><sup>-</sup>, CH<sub>3</sub>S<sup>-</sup>, HO<sup>-</sup>, H<sub>2</sub>O.

Answer: <https://biology-forums.com/index.php?topic=1897795>

### Question 1485

What salt results from the reaction of benzoic acid with potassium hydroxide?

Answer: <https://biology-forums.com/index.php?topic=1898876>

### Question 1486

Pyridine typically undergoes electrophilic aromatic substitution \_\_\_\_\_ rapidly than benzene, and its preferred site of substitution is the \_\_\_\_\_ position.

- more; 2
- less; 3
- less; 2
- more; 4
- more; 3

Answer: <https://biology-forums.com/index.php?topic=1898799>

### Question 1487

Draw the chair conformation of the cyclohexane derivative shown.

Answer: <https://biology-forums.com/index.php?topic=1897455>

### Question 1488

Provide the name of the major alkene product that results when (2S,3S)-2-bromo-3-methylpentane is treated with sodium methoxide in methanol.

Answer: <https://biology-forums.com/index.php?topic=1897999>

### Question 1489

Which of the following amino acids has its isoelectric point at the highest pH?

- arginine
- valine
- glycine
- methionine
- aspartic acid

Answer: <https://biology-forums.com/index.php?topic=1900010>

### Question 1490

How many distinct monochlorinated products can result when cyclopentane is subjected to free radical chlorination?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1897559>

### Question 1491

Which of the following would not form a micelle?

- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_3^+$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OPO}_3^-$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{COONa}$
- They would all form micelles

Answer: <https://biology-forums.com/index.php?topic=1900182>

### Question 1492

Even assuming the molecule below is planar, it would still be classified as non-aromatic. Why?

Answer: <https://biology-forums.com/index.php?topic=1899723>

### Question 1493

A polymer with a high degree of crystallinity is usually \_\_\_\_\_ than a similar polymer with a lower degree of crystallinity.

- less dense and less rigid
- less dense but stronger
- denser and more rigid
- less dense but more rigid
- denser but less rigid

Answer: <https://biology-forums.com/index.php?topic=1900327>

### Question 1494

Provide the line-angle formula (skeletal structure) for  $(\text{CH}_3\text{CH}_2)_2\text{C}=\text{O}$ .

Answer: <https://biology-forums.com/index.php?topic=1897201>

### Question 1495

What three-word term is abbreviated NMR?

Answer: <https://biology-forums.com/index.php?topic=1899312>

### Question 1496

Which of the following reagents is the best choice for oxidizing a primary alcohol to an aldehyde?

- $\text{Na}_2\text{Cr}_2\text{O}_7, \text{H}_2\text{SO}_4$
- pyridinium chlorochromate
- $\text{KMnO}_4$
- $\text{H}_2\text{CrO}_4$
- $\text{LiAlH}_4$

Answer: <https://biology-forums.com/index.php?topic=1898424>

### Question 1497

How could you make decan-2-one from 1-bromoheptane?

- Malonic ester synthesis
- Michael addition
- Acetoacetic ester synthesis
- Dieckman cyclization

Answer: <https://biology-forums.com/index.php?topic=1899161>

### Question 1498

How do alkyl substituents stabilize a carbocationic center to which they are attached?

- through an inductive donation of electron density to the cationic center
- through an inductive removal of electron density from the cationic center
- through hyperconjugation
- both A and C
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1897591>

### Question 1499

What is the chemical shift of the carbon bound to oxygen in ethers in  $^{13}\text{C}$  NMR?

Answer: <https://biology-forums.com/index.php?topic=1899511>

### Question 1500

How does vulcanization of rubber alter its structure and properties?

Answer: <https://biology-forums.com/index.php?topic=1900275>

### Question 1501

Draw the structure of (S)-3-chloro-3-methylhexane. Take particular care to indicate stereochemistry properly.

Answer: <https://biology-forums.com/index.php?topic=1897661>

### Question 1502

When methanol (CH<sub>3</sub>OH) acts as a base, its conjugate acid is \_\_\_\_\_.

- CH<sub>4</sub>OH
- -CH<sub>2</sub>OH
- CH<sub>3</sub>OH<sub>2</sub><sup>+</sup>
- CH<sub>4</sub>O<sup>+</sup>
- CH<sub>3</sub>O<sup>-</sup>

Answer: <https://biology-forums.com/index.php?topic=1897130>

### Question 1503

Draw the chair conformer of cyclohexane. Label the axial hydrogens (H<sub>a</sub>) and the equatorial hydrogens (H<sub>e</sub>).

Answer: <https://biology-forums.com/index.php?topic=1897442>

### Question 1504

Provide the structure of the major organic product which results when \_\_\_\_\_ is treated with PPh<sub>3</sub> and the resulting salt is reacted with one equivalent of butyllithium.

Answer: <https://biology-forums.com/index.php?topic=1898692>

### Question 1505

How many enantiomers are there of the molecule shown below?

- 3
- 6
- 2
- 1
- 0

Answer: <https://biology-forums.com/index.php?topic=1897719>

### Question 1506

Absorption of what type of electromagnetic radiation results in electronic transitions?

- X-rays
- radio waves
- microwaves
- ultraviolet light
- infrared light

Answer: <https://biology-forums.com/index.php?topic=1899200>

### Question 1507

Show the reagents necessary to prepare 1-ethoxy-1-methylcyclopentane from 1-methylcyclopentene.

Answer: <https://biology-forums.com/index.php?topic=1899522>

### Question 1508

Draw all monochlorination products expected from reaction of chlorine with 3,4-dimethylhexane. Circle the major product.

Answer: <https://biology-forums.com/index.php?topic=1897582>

### Question 1509

Absorption of what type of electromagnetic radiation results in transitions among allowed rotational motions?

- X-rays

- radio waves
- microwaves
- ultraviolet light
- infrared light

Answer: <https://biology-forums.com/index.php?topic=1899201>

### Question 1510

2-Methylpentan-3-ol is classified as \_\_\_\_\_.

- a secondary alcohol
- a tertiary alcohol
- an enol
- a phenol
- a primary alcohol

Answer: <https://biology-forums.com/index.php?topic=1898305>

### Question 1511

What is the major difference between an antiaromatic and aromatic compound?

- Antiaromatic compounds have at least one  $sp^3$  hybridized atom in the ring.
- The structure must be cyclic for aromatic but not antiaromatic compounds.
- Antiaromatic compounds can assume a chair-like structure while aromatic compounds are nearly flat.
- Only aromatic compounds follow Huckle's rule.
- Aromatic compounds cannot have a charged atom in the structure.

Answer: <https://biology-forums.com/index.php?topic=1899719>

### Question 1512

(-)-Lactic acid has a specific rotation of  $-3.8^\circ$ . What is the specific rotation of a solution containing 7.5 g of (-)-lactic acid and 2.5 g of (+)-lactic acid?

Answer: <https://biology-forums.com/index.php?topic=1897686>

### Question 1513

Give a detailed, stepwise mechanism for the formation of the activated acyl derivative from the reaction of an amino acid with N,N'-dicyclohexylcarbodiimide.

Answer: <https://biology-forums.com/index.php?topic=1900074>

### Question 1514

Which of the following amino acids has its isoelectric point at the highest pH?

- serine
- lysine
- cysteine
- histidine
- glutamic acid

Answer: <https://biology-forums.com/index.php?topic=1900049>

### Question 1515

Which of the following is produced by the reaction of  $(CH_3CH_2)_2S$  with  $CH_3CH_2I$ ?

- $(CH_3CH_2)_3S^+ I^-$
- $CH_3SCH_2CH_2CH_3$
- $CH_3CH_2CH_2CH_2I$
- $(CH_3CH_2)_3S$
- $CH_3CH_2SCH_2CH_2I$

Answer: <https://biology-forums.com/index.php?topic=1899547>

### Question 1516

In a Haworth projection of a five-membered cyclic hemiacetal, \_\_\_\_\_.

- the ring oxygen is drawn in the front
- the ring oxygen is drawn in the back
- the C6 carbon is drawn on the right
- the C2 carbon is drawn on the left
- all hydroxyls are always on the same side of the molecule

Answer: <https://biology-forums.com/index.php?topic=1899865>

### Question 1517

Show how one might synthesize phenylacetone using toluene, NaCN, and any other necessary reagents.

Answer: <https://biology-forums.com/index.php?topic=1899042>

### Question 1518

Is the thermal [4+2] cycloaddition between allyl anion and ethylene an allowed one? To answer, draw the HOMO of allyl anion and the LUMO of ethylene, and comment on the symmetry match of the two.

Answer: <https://biology-forums.com/index.php?topic=1899691>

### Question 1519

Provide the major organic product of the reaction below and a detailed, stepwise mechanism which accounts for its formation.

Answer: <https://biology-forums.com/index.php?topic=1897840>

### Question 1520

When 3-iodo-3-ethylpentane is treated with sodium methoxide in methanol, the major organic product is an \_\_\_\_\_ that is generated through an \_\_\_\_\_ mechanism.

- alkene; E2
- ether; SN2
- alkene; E1
- ether; E1
- ether; SN1

Answer: <https://biology-forums.com/index.php?topic=1897878>

### Question 1521

How many nodes, other than the node coincident with the molecular plane, are present in the LUMO of 1,3,5-hexatriene?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1899699>

### Question 1522

Provide the line-angle formula (skeletal structure) for  $(\text{CH}_3)_2\text{CHCH}_2\text{CHO}$ .

Answer: <https://biology-forums.com/index.php?topic=1897202>

### Question 1523

Is the all-cis form of [10]annulene aromatic? Explain.

Answer: <https://biology-forums.com/index.php?topic=1899734>

### Question 1524

Draw the neutral form of L-phenylalanine in a line-wedge structure with the appropriate stereochemistry.

Answer: <https://biology-forums.com/index.php?topic=1900017>

### Question 1525

Which of the statements below accurately describe(s) alkanes?

- Alkanes are hydrocarbons which contain only single bonds.
- Alkanes belong to the class of unsaturated hydrocarbons.
- Alkanes are the simplest and least reactive class of organic compounds.
- both A and B
- both A and C

Answer: <https://biology-forums.com/index.php?topic=1897339>

### Question 1526

Describe how soaps function as cleaning agents.

Answer: <https://biology-forums.com/index.php?topic=1900165>



### Question 1527

A series of compounds, like the n-alkanes, that differ only by the number of groups, is called a(n) \_\_\_\_\_ series.

Answer: <https://biology-forums.com/index.php?topic=1897345>

### Question 1528

Disulfide linkages can form between \_\_\_\_\_.

- a methionine residue and a threonine residue
- two cysteine residues
- a cysteine residue and a methionine residue
- two threonine residues
- two methionine residues

Answer: <https://biology-forums.com/index.php?topic=1900037>

### Question 1529

Oleic acid is an example of \_\_\_\_\_ fatty acid. A molecule of oleic acid contains a single carbon-carbon double bond and \_\_\_\_\_ carbon atoms.

- a saturated; 52
- a saturated; 18
- an unsaturated; 18
- an unsaturated; 9
- a saturated; 9

Answer: <https://biology-forums.com/index.php?topic=1900105>

### Question 1530

Carboxylic acids can be made from Grignards by treating the Grignard reagents with \_\_\_\_\_.

- carbon dioxide
- carbon monoxide
- esters
- diborane
- aldehydes

Answer: <https://biology-forums.com/index.php?topic=1898901>

### Question 1531

Draw the Lewis structure for 2-propanol,  $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ , including all non-bonding lone pairs.

Answer: <https://biology-forums.com/index.php?topic=1897163>

### Question 1532

What is Zaitsev's rule?

Answer: <https://biology-forums.com/index.php?topic=1897846>

### Question 1533

Are the two compounds shown below best described as cis-trans isomers, constitutional isomers, or not isomeric?

Answer: <https://biology-forums.com/index.php?topic=1897269>

### Question 1534

Compound X is a cyclic six-carbon monosaccharide. In solution, X gives a positive Tollen's test. After X is treated with excess methyl iodide and silver oxide and the resulting material is hydrolyzed in  $\text{H}_3\text{O}^+$ , the product has a hydroxyl group only at the C5 position. What is the ring size in compound X?

Answer: <https://biology-forums.com/index.php?topic=1899920>

### Question 1535

Which of the following bond arrangements is not commonly found in naturally occurring disaccharides?

- a 1,4' link
- a 1,5' link
- a 1,6' link
- a 1,1' link
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1899940>

### Question 1536

Which series of reactions described below will result in the formation of compound A, starting with compound B?

- 1. HO-(CH<sub>2</sub>)<sub>2</sub>-OH /trace H<sub>3</sub>O+ 2. DMSO (COCl<sub>2</sub>)/Et<sub>3</sub>N, CH<sub>2</sub>Cl<sub>2</sub> 3. MgBr-(CH<sub>2</sub>)<sub>2</sub>-CH<sub>3</sub>/diethyl ether 4. work-up with H<sub>3</sub>O+ 5. PCC
- 1. PCC 2. SOCl<sub>2</sub> 3. LiCu-((CH<sub>2</sub>)<sub>2</sub>-CH<sub>3</sub>)<sub>2</sub> 4. work-up with H<sub>3</sub>O+
- 1. Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>/H<sub>2</sub>SO<sub>4</sub> 2. SOCl<sub>2</sub> 3. MgBr-(CH<sub>2</sub>)<sub>2</sub>-CH<sub>3</sub>/diethyl ether 4. work-up with H<sub>3</sub>O+
- both A and B
- both B and C

Answer: <https://biology-forums.com/index.php?topic=1898717>

### Question 1537

The acidity of a thiol proton most closely resembles which of the following acids?

- phenol
- acetic acid
- ethanol
- ammonia

Answer: <https://biology-forums.com/index.php?topic=1898409>

### Question 1538

Which of the species below is less basic than acetylide?

- CH<sub>3</sub>MgBr
- CH<sub>3</sub>ONa
- CH<sub>3</sub>Li
- both A and C
- all of the above

Answer: <https://biology-forums.com/index.php?topic=1898216>

### Question 1539

Why is carbon-carbon splitting typically not seen in <sup>13</sup>C NMR spectra?

Answer: <https://biology-forums.com/index.php?topic=1899367>

### Question 1540

Predict the structure of the products resulting from the reaction between limonene, a natural terpene found in citrus fruit, and ozone, followed by work up with dimethyl sulfide.

Answer: <https://biology-forums.com/index.php?topic=1898126>

### Question 1541

How could you tell the difference between these two compounds with <sup>1</sup>H NMR?

Answer: <https://biology-forums.com/index.php?topic=1899426>

### Question 1542

Provide the name of the bromoalkane shown below.

Answer: <https://biology-forums.com/index.php?topic=1897752>

### Question 1543

What crossed-aldol product results when butanal is heated in the presence of excess benzaldehyde and sodium hydroxide?

Answer: <https://biology-forums.com/index.php?topic=1899142>

### Question 1544

What type of polymer uses a diisocyanate as one of its monomer components?

- polycarbonates
- polyurethanes
- polyamides
- polyesters
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900306>

### Question 1545

Predict the two most likely mechanisms for the reaction of 2-iodohexane with potassium hydroxide.

- E1 and E2
- SN2 and E2
- E1 and SN1
- SN1 and SN2

Answer: <https://biology-forums.com/index.php?topic=1897874>

### Question 1546

Rank the following dienes in order of increasing stability: trans-1,3-pentadiene, cis-1,3-pentadiene, 1,4-pentadiene, and 1,2-pentadiene.

Answer: <https://biology-forums.com/index.php?topic=1899581>

### Question 1547

Provide the name of the major organic product that results when trans-4-methylcyclohexanol is treated with thionyl chloride.

Answer: <https://biology-forums.com/index.php?topic=1898481>

### Question 1548

Provide the skeletal structures of the five constitutional isomers with molecular formula C<sub>6</sub>H<sub>14</sub>.

Answer: <https://biology-forums.com/index.php?topic=1897278>

### Question 1549

How many peaks are in the proton spin decoupled <sup>13</sup>C NMR spectrum of 1,3,5-trinitrobenzene?

- 1
- 2
- 3
- 4
- 6

Answer: <https://biology-forums.com/index.php?topic=1899828>

### Question 1550

The reaction of what two compounds produces n-butyllithium?

Answer: <https://biology-forums.com/index.php?topic=1898354>

### Question 1551

When aniline is treated with molecular bromine in the presence of a mild base (NaHCO<sub>3</sub>), polyhalogenation occurs. However, when aniline is treated with molecular bromine in the presence of a strong Lewis Acid like FeBr<sub>3</sub>, no reaction takes place. Briefly explain this difference in reactivity.

Answer: <https://biology-forums.com/index.php?topic=1898793>

### Question 1552

What term describes the structural relationship between (2R,3R,4S)-2,3,4-trichloroheptane and (2R,3R,4R)-2,3,4-trichloroheptane?

- constitutional isomers
- diastereomers
- conformers
- enantiomers
- not isomers

Answer: <https://biology-forums.com/index.php?topic=1897710>

### Question 1553

Which of the following is another name for a phosphatidyl choline?

- an androsterone
- a steroid
- a triglyceride
- a lecithin
- a cephalin

Answer: <https://biology-forums.com/index.php?topic=1900175>

### Question 1554

For which of the following alkenes will cis- and trans- isomers not exist?

- a) only
- b) only
- both a) and c)
- d) only
- both c) and d)

Answer: <https://biology-forums.com/index.php?topic=1897924>

### Question 1555

Draw the most stable conformation of cis-1-t-butyl-4-methylcyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897454>

### Question 1556

Devise an efficient method for preparing ethylisopropylamine from ethylamine.

Answer: <https://biology-forums.com/index.php?topic=1898841>

### Question 1557

How many moles of BH<sub>3</sub> need to be added to completely react with 1 mole of hex-1-ene?

- 1 mole of BH<sub>3</sub>
- 1/2 mole of BH<sub>3</sub>
- 1/3 mole of BH<sub>3</sub>
- 3 mole of BH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1898068>

### Question 1558

The reaction of LDA with acetophenone produces \_\_\_\_\_.

- an ylide
- an enol
- alkylation
- an enolate
- halogenation

Answer: <https://biology-forums.com/index.php?topic=1899083>

### Question 1559

Arrange the following alcohols in order of increasing boiling point:

(CH<sub>3</sub>)<sub>3</sub>COH, CH<sub>3</sub>(CH<sub>2</sub>)<sub>4</sub>OH, (CH<sub>3</sub>)<sub>3</sub>CCH<sub>2</sub>OH, and (CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>CH<sub>2</sub>OH.

Answer: <https://biology-forums.com/index.php?topic=1898327>

### Question 1560

Which of the following does not have a broad absorption with one or more spikes that is centered about 3300 cm<sup>-1</sup> in the IR?

- (CH<sub>2</sub>=CHCH<sub>2</sub>)<sub>2</sub>NH
- (CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>)<sub>3</sub>N
- (CH<sub>3</sub>)<sub>3</sub>CNH<sub>2</sub>
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>
- (CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>NH

Answer: <https://biology-forums.com/index.php?topic=1899263>

### Question 1561

The bond lengths in a substituted cyclobutadiene compounds were determined by computational methods to display very unequal bond lengths (1.354 and 1.608 Å). What does this suggest about resonance structures in this compound? (J. Phys. Chem. A, 2000, 104, 1246-1255)

Answer: <https://biology-forums.com/index.php?topic=1899712>

### Question 1562

When a high energy electron impacts molecule M in the ionization chamber, what type of species is initially produced?

- radical
- anion
- radical cation
- cation
- radical anion

Answer: <https://biology-forums.com/index.php?topic=1899288>

### Question 1563

Compare the relative heats of hydrogenation of cyclobutene and cyclopentene and explain the difference in magnitude.

Answer: <https://biology-forums.com/index.php?topic=1897966>

### Question 1564

What intermolecular forces are present among molecules in dimethyl ether,  $\text{CH}_3\text{OCH}_3$ ?

- both London dispersion forces and hydrogen bonding
- London forces only
- both London dispersion forces and dipole-dipole forces
- hydrogen bonding only

Answer: <https://biology-forums.com/index.php?topic=1897295>

### Question 1565

Provide the structure of the open-chain form of L-altrose.

Answer: <https://biology-forums.com/index.php?topic=1899853>

### Question 1566

What term is given to the sulfur analogues of ethers?

Answer: <https://biology-forums.com/index.php?topic=1899544>

### Question 1567

Calculate the magnetic field that corresponds to the proton resonance frequency of 300.00 MHz. The gyromagnetic ratio of the  $^1\text{H}$  nucleus is

Answer: <https://biology-forums.com/index.php?topic=1899317>

### Question 1568

Draw the Fischer projection of (2S,3R)-2,3-dihydroxybutanoic acid, and label it as erythro or threo.

Answer: <https://biology-forums.com/index.php?topic=1899857>

### Question 1569

Use the following three structures to answer the two questions below.

The relationship between I and II is: \_\_\_\_\_.

- enantiomers
- constitutional isomers
- same compound
- diastereomers

Answer: <https://biology-forums.com/index.php?topic=1897713>

### Question 1570

Using ethanol as your only source of carbon compounds and using any other necessary inorganic reagents, propose a synthesis of acetonitrile.

Answer: <https://biology-forums.com/index.php?topic=1899069>

### Question 1571

A bicyclic alkane contains 12 carbon atoms. How many hydrogen atoms does it contain?

- 22
- 24
- 28
- 20
- 26

Answer: <https://biology-forums.com/index.php?topic=1897346>

### Question 1572

Above  $T_m$ , crystalline polymers exist as \_\_\_\_\_.

- thermoplastics which are flexible and moldable
- liquids which are flexible and moldable
- glasses of low flexibility

- thermoplastics which are readily extruded to form fibers
- liquids which are readily extruded to form fibers

Answer: <https://biology-forums.com/index.php?topic=1900330>

### Question 1573

Use the curved arrow formalism to show the movement of electron pairs in the following reaction.

Answer: <https://biology-forums.com/index.php?topic=1897226>

### Question 1574

What Grignard reagent and carbonyl compound could be used to prepare 1-ethylcyclohexanol?

Answer: <https://biology-forums.com/index.php?topic=1898364>

### Question 1575

What would you start with when making phenyl alanine using the Strecker Synthesis?

Answer: <https://biology-forums.com/index.php?topic=1900020>

### Question 1576

Which of the following is not an addition polymer?

- Kevlar
- Orlon
- Teflon
- Plexiglas
- polyethylene

Answer: <https://biology-forums.com/index.php?topic=1900222>

### Question 1577

What major organic product results when 1-octyne is treated with sodium metal in liquid ammonia?

- 1-octyne
- (Z)-1-octene
- (E)-1-octene
- 1-octene, you can't call it E or Z
- octane

Answer: <https://biology-forums.com/index.php?topic=1898262>

### Question 1578

One or more of the atoms in the structure shown should have nonzero formal charges. Add the correct formal charge/s. (All non-bonding electrons have been included.)

Answer: <https://biology-forums.com/index.php?topic=1897176>

### Question 1579

Draw the major regioisomeric product generated in the reaction below.

Answer: <https://biology-forums.com/index.php?topic=1898034>

### Question 1580

Complete hydrolysis of a hexapeptide gives 2 Gly, Leu, Phe, Pro, and Tyr. Reaction of the peptide with phenylisothiocyanate gave the phenylthiohydantoin of Pro. Partial hydrolysis of the peptide gave the following fragments: Phe-Gly-Tyr, Gly-Phe-Gly, Pro-Leu-Gly, Leu-Gly-Phe. What is the structure of the peptide?

Answer: <https://biology-forums.com/index.php?topic=1900066>

### Question 1581

Provide the structure of the predominant form of lysine present in an aqueous solution at biological pH, pH = 7.4.

Answer: <https://biology-forums.com/index.php?topic=1899994>

### Question 1582

Which of the following bases are sufficiently strong to deprotonate a terminal alkyne with an equilibrium constant greater than 1?

1)sodium methoxide3)n-butyl lithium2)lithium diisopropyl amide4)phenylmagnesium bromide

- 2 and 3
- 1, 2, and 3
- 2, 3 and 4
- 1, 2, 3 and 4
- 3 and 4

Answer: <https://biology-forums.com/index.php?topic=1898226>

### Question 1583

When 1,3-butadiene reacts with  $\text{CH}_2\text{CHCN}$ , which of the terms below best describes the product mixture?

- a mixture of bicyclic compounds
- a single compound
- optically active
- a mixture of two diastereomers
- a racemic mixture

Answer: <https://biology-forums.com/index.php?topic=1899650>

### Question 1584

Poly(lactic acid) is a biodegradable polymer that is used in 3D printing. It can be made through the polymerization of L-lactic acid (below). Draw three repeat units of the polymer that is formed with the appropriate stereochemistry.

Answer: <https://biology-forums.com/index.php?topic=1900317>

### Question 1585

Which of the following terms best describes the compound below?

- a lecithin
- a steroid
- a prostaglandin
- a glyceride
- a diterpene

Answer: <https://biology-forums.com/index.php?topic=1900193>

### Question 1586

Poisonings by methanol and ethylene glycol are relatively common. How are these poisonings treated clinically?

Answer: <https://biology-forums.com/index.php?topic=1898450>

### Question 1587

When water is shaken with dichloromethane, a two-phase system results. Which compound forms the upper phase? Explain.

Answer: <https://biology-forums.com/index.php?topic=1897777>

### Question 1588

Show the best method for preparing 4-propoxytoluene via the Williamson ether synthesis.

Answer: <https://biology-forums.com/index.php?topic=1899518>

### Question 1589

When cyclohexene is treated with  $\text{KMnO}_4$ ,  $\text{H}_2\text{O}$ , the syn-1,2-diol is produced. What reaction occurs when benzene is similarly treated?

Answer: <https://biology-forums.com/index.php?topic=1899707>

### Question 1590

The compound produced when 3-methylpent-2-ene undergoes hydrogenation in the presence of a platinum catalyst is \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897942>

### Question 1591

What sequence of reagents is needed to convert benzene into m-bromoethylbenzene?

Answer: <https://biology-forums.com/index.php?topic=1898573>

### Question 1592

Derivatives of the compound shown below are currently being examined for their effectiveness in treating drug addiction and metabolic syndrome (J.

Med. Chem. 2006, 872). Which sequence ranks the following aromatic rings of this compound in order of increasing reactivity in an electrophilic aromatic substitution reaction (slowest to fastest reacting)?

- 2 < 3 < 1
- 2 < 1 < 3
- 1 < 2 < 3
- 3 < 1 < 2
- 3 < 2 < 1

Answer: <https://biology-forums.com/index.php?topic=1898551>

### Question 1593

For most compounds in which a nitrogen atom bears no formal charge, the valence of this nitrogen atom is \_\_\_\_\_.

Answer: <https://biology-forums.com/index.php?topic=1897111>

### Question 1594

Draw the Newman projection of the highest energy conformation that results from rotation about the C2-C3 bond of 2-methylbutane.

Answer: <https://biology-forums.com/index.php?topic=1897416>

### Question 1595

Both (E)- and (Z)-hex-3-ene can be treated with D<sub>2</sub> in the presence of a platinum catalyst. How are the products from these two reactions related to each other?

- The (E)- and (Z)-isomers generate the same products but in differing amounts.
- The (E)- and (Z)-isomers generate the same products in exactly the same amounts.
- The products of the two isomers are related as constitutional isomers.
- The products of the two isomers are related as enantiomers.
- The products of the two isomers are related as diastereomers.

Answer: <https://biology-forums.com/index.php?topic=1898099>

### Question 1596

Which of the following compounds would show only one triplet in its off resonance decoupled spectrum?

- 2-pentanone
- acetone
- pentanal
- butanal
- 3-pentanone

Answer: <https://biology-forums.com/index.php?topic=1898652>

### Question 1597

How many distinct trichlorobenzene isomers are possible?

- 2
- 3
- 4
- 5
- 6

Answer: <https://biology-forums.com/index.php?topic=1899793>

### Question 1598

Without any change in conformation, translate the Newman projection shown below to a perspective structure.

Answer: <https://biology-forums.com/index.php?topic=1897421>

### Question 1599

Why are the equilibrium constants for hydration of aldehydes typically greater than those of ketones?

Answer: <https://biology-forums.com/index.php?topic=1898687>

### Question 1600

Which of the following statements is (are) true for the compound (R)-2-butanol?

- This compound has an enantiomer.
- This compound is optically active.



- This compound is chiral.
- all of the above
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897672>

### Question 1601

Which of the following is the best initiator for a free-radical polymerization?

- BuLi
- PhOH
- (PhCO<sub>2</sub>)<sub>2</sub>
- CH<sub>3</sub>CH(OCH<sub>3</sub>)<sub>2</sub>
- BF<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1900212>

### Question 1602

What class of organic product results when 1-heptyne is treated with a mixture of mercuric acetate in aqueous sulfuric acid?

- diol
- ketone
- aldehyde
- carboxylic acid
- ether

Answer: <https://biology-forums.com/index.php?topic=1898260>

### Question 1603

What multiplicities are observed in the off-resonance decoupled <sup>13</sup>C spectrum of 2,3-dimethyl-but-2-ene?

Answer: <https://biology-forums.com/index.php?topic=1899407>

### Question 1604

Which of the following depictions most closely resembles the structure of the transition state for the following acid-base reaction?

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1897588>

### Question 1605

Provide the reagents necessary to convert (E)-but-2-ene to meso-butane-2,3-diol.

Answer: <https://biology-forums.com/index.php?topic=1898349>

### Question 1606

Which intermolecular force is primarily responsible for the interactions among alkane molecules?

Answer: <https://biology-forums.com/index.php?topic=1897393>

### Question 1607

Draw an energy diagram for a two step reaction where the structure of the transition state of the rate determining step most closely resembles the starting material and the overall reaction is exothermic.

Answer: <https://biology-forums.com/index.php?topic=1897585>

### Question 1608

Which amino acid's side chain is negatively charged at biological pH, pH = 7.4?

- glutamine
- arginine
- serine
- aspartic acid
- tyrosine

Answer: <https://biology-forums.com/index.php?topic=1899987>

### Question 1609

What are the products of the reaction of phenylacetic acid with oxalyl chloride?

Answer: <https://biology-forums.com/index.php?topic=1898957>

### Question 1610

Name the compound generated when ethylbenzene is treated with CO, HCl, AlCl<sub>3</sub>, and CuCl.

Answer: <https://biology-forums.com/index.php?topic=1898666>

### Question 1611

The structure below is a potent analgesic agent (pain reliever) (J. Med. Chem., 2009, 5685). How many secondary carbons are in this structure?

- 4
- 2
- 6
- 12

Answer: <https://biology-forums.com/index.php?topic=1897343>

### Question 1612

Devise an efficient method for preparing 1-pentanamine from but-1-ene.

Answer: <https://biology-forums.com/index.php?topic=1898848>

### Question 1613

Provide the structure of L-aspartic acid at pH 12.0.

Answer: <https://biology-forums.com/index.php?topic=1899992>

### Question 1614

What results when cyclopentene oxide is treated with aqueous base?

- a racemic mixture of cis-1,2-diols
- a meso trans-1,2-diol
- a meso cis-1,2-diol
- a racemic mixture of trans-1,2-diols
- cyclopentene

Answer: <https://biology-forums.com/index.php?topic=1899563>

### Question 1615

Which region of the electromagnetic spectrum, IR or UV, contains photons of the higher energy?

Answer: <https://biology-forums.com/index.php?topic=1899206>

### Question 1616

Provide the structure of the major organic product that results when 4-methyl-1-pentanol is treated with PBr<sub>3</sub>.

Answer: <https://biology-forums.com/index.php?topic=1898474>

### Question 1617

Add the appropriate formal charge to each atom in the molecule below. It is not necessary to indicate formal charges when zero. (All non-bonding electrons are included.)

Answer: <https://biology-forums.com/index.php?topic=1897172>

### Question 1618

Which of the following has a C—H stretch that occurs at the lowest stretching frequency?

- hex-1-yne
- hex-1-ene
- (E)-hex-2-ene
- hexane
- hex-2-yne

Answer: <https://biology-forums.com/index.php?topic=1899236>

### Question 1619

Terpenes which contain two isoprene units are called \_\_\_\_\_.

- triterpenes

- monoterpenes
- tetraterpenes
- sesquiterpenes
- diterpenes

Answer: <https://biology-forums.com/index.php?topic=1900197>

### Question 1620

What compound is produced when cyclohexene is treated with concentrated  $\text{KMnO}_4$ ?

- adipic acid
- benzoic acid
- hexanoic acid
- cyclohexanecarboxylic acid
- succinic acid

Answer: <https://biology-forums.com/index.php?topic=1898907>

### Question 1621

Which of the following additions to alkenes occur(s) specifically in an anti fashion?

- addition of  $\text{H}_2$
- hydroboration-oxidation
- addition of  $\text{Br}_2$
- addition of  $\text{H}_2\text{O}$  in dilute acid
- both A and B

Answer: <https://biology-forums.com/index.php?topic=1898082>

### Question 1622

Consider the constitutional isomers 2-methylbut-1-ene, 2-methylbut-2-ene, and 3-methylbut-1-ene. When each of these alkenes is subjected to catalytic hydrogenation ( $\text{H}_2$ , Pt), a single product results. Which of the following best describes the structural relationship among these products?

- The products are enantiomers.
- The products are cis-trans isomers.
- The products are identical.
- The products are diastereomers.
- The products are constitutional isomers.

Answer: <https://biology-forums.com/index.php?topic=1897948>

### Question 1623

Which of the following is classified as a vinylic halide?

- $\text{CH}_3\text{CHCHCH}_2\text{Cl}$
- $\text{BrCH}_2\text{CHCH}_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$
- $\text{CH}_3\text{CHCHOH}$
- $\text{CH}_3\text{CHCHCl}$

Answer: <https://biology-forums.com/index.php?topic=1897749>

### Question 1624

What term describes the highest-energy structure in a molecular collision which leads to reaction?

Answer: <https://biology-forums.com/index.php?topic=1897542>

### Question 1625

Ozonolysis-reduction of an unknown alkene gives equal amounts of  $\text{CH}_3\text{CH}_2\text{CHO}$  and  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$ . Name the unknown alkene.

Answer: <https://biology-forums.com/index.php?topic=1898119>

### Question 1626

\_\_\_\_\_ of a protein usually results in the precipitation of the protein and loss of its biological activity.

Answer: <https://biology-forums.com/index.php?topic=1900086>

### Question 1627

In polymerization reactions what purpose does benzoyl peroxide usually serve?

Answer: <https://biology-forums.com/index.php?topic=1900247>

### Question 1628

The structure of D-arabinose is shown below. Which of the following correctly describes the configurations of the asymmetric carbons in D-arabinose?

- 2S, 3R, 4S
- 2R, 3S, 4S
- 2R, 3S, 4R
- 2S, 3S, 4R
- 2S, 3R, 4R

Answer: <https://biology-forums.com/index.php?topic=1899847>

### Question 1629

An unknown alkyne with a molecular formula of C<sub>6</sub>H<sub>10</sub> gives only one product upon ozonolysis, which is shown below. What is the structure of the starting material?

- CH<sub>3</sub>CH<sub>2</sub>CCCH<sub>2</sub>CH<sub>3</sub>
- CH<sub>3</sub>CH<sub>2</sub>CCCH<sub>3</sub>
- CH<sub>3</sub>CH<sub>2</sub>CCH
- The structure can't be determined with the information given.

Answer: <https://biology-forums.com/index.php?topic=1898292>

### Question 1630

What alkyl lithium would react with acetic acid to form 2-butanone?

- methyl lithium
- vinyl lithium
- propyl lithium
- phenyl lithium
- ethyl lithium

Answer: <https://biology-forums.com/index.php?topic=1898952>

### Question 1631

Which of the following alkyl halides reacts most rapidly via an S<sub>N</sub>2 reaction with NaCN?

- (R)-2-bromohexane
- 1-fluorohexane
- 1-iodohexane
- 1-iodo-1-methylcyclohexane
- iodocyclohexane

Answer: <https://biology-forums.com/index.php?topic=1897809>

### Question 1632

Which of the following is not a property of ethers?

- They have relatively high boiling points for their molecular weights.
- They are nonhydroxylic.
- They are normally unreactive toward strong bases.
- They dissolve a wide range of polar substances.
- They dissolve a wide range of nonpolar substances.

Answer: <https://biology-forums.com/index.php?topic=1899482>

### Question 1633

Describe the major products of the following reaction and predict which of the products would predominate. Explain and defend your answer.

Answer: <https://biology-forums.com/index.php?topic=1897986>

### Question 1634

Draw the cyclic hemiacetal form of D-glucose both as a chair conformation and as a Haworth projection.

Answer: <https://biology-forums.com/index.php?topic=1899836>

### Question 1635

In 1,3,5-hexatriene, there are \_\_\_\_\_ nodes in the HOMO and \_\_\_\_\_ nodes in the LUMO for this molecule.

- 2; 0
- 2; 1

- 2; 3
- 1; 2

Answer: <https://biology-forums.com/index.php?topic=1899578>

### Question 1636

Arrange the following three amides in order of increasing boiling point: propanamide, N-methylacetamide, and N,N-dimethylformamide.

Answer: <https://biology-forums.com/index.php?topic=1898992>

### Question 1637

Is the [10]annulene shown below aromatic? Explain.

Answer: <https://biology-forums.com/index.php?topic=1899735>

### Question 1638

Consider 3-pentanone (shown below). What m/z fragments would you expect to see in the mass spectrum of this compound?

- 15
- 43
- 57
- You would expect to see all three fragments.

Answer: <https://biology-forums.com/index.php?topic=1899309>

### Question 1639

Name the aldol produced when butanal is treated with NaOH.

Answer: <https://biology-forums.com/index.php?topic=1899144>

### Question 1640

Draw the Fischer projection of (S)-2-bromobutane.

Answer: <https://biology-forums.com/index.php?topic=1897650>

### Question 1641

Which compound is more soluble in water? Briefly explain your choice.

CH<sub>3</sub>OCH<sub>3</sub> or CH<sub>3</sub>CH<sub>2</sub>OH

Answer: <https://biology-forums.com/index.php?topic=1897305>

### Question 1642

In the reduction of alkynes using sodium in liquid ammonia, which of the species below is not thought to be an intermediate in the commonly accepted mechanism?

- vinyl cation
- radical anion
- vinyl anion
- vinyl radical

Answer: <https://biology-forums.com/index.php?topic=1898274>

### Question 1643

Provide a synthesis to convert but-1-ene to buta-1,3-diene.

Answer: <https://biology-forums.com/index.php?topic=1898017>

### Question 1644

Which of the following terms best describes the exterior surface of a soap micelle in water?

- hydrophobic
- hard
- hydrogenated
- hydrophilic
- saponified

Answer: <https://biology-forums.com/index.php?topic=1900151>

### Question 1645

Provide a reasonable synthesis of racemic alanine from ethanol.

Answer: <https://biology-forums.com/index.php?topic=1900018>

### Question 1646

Draw the alkene of formula C<sub>5</sub>H<sub>10</sub> which evolves the most heat per mole upon hydrogenation.

Answer: <https://biology-forums.com/index.php?topic=1897955>

### Question 1647

Rank the free radicals (I-III) shown below in order of decreasing stability (i.e., from most stable to least stable).

- I > III > II
- II > I > III
- II > III > I
- I > II > III
- III > II > I

Answer: <https://biology-forums.com/index.php?topic=1897572>

### Question 1648

What characterizes a pericyclic reaction?

Answer: <https://biology-forums.com/index.php?topic=1899686>

### Question 1649

If the side groups of a polymer occur randomly on either side of the polymer backbone, then the polymer is called \_\_\_\_\_.

- enantiotactic
- syndiotactic
- randiotactic
- isotactic
- atactic

Answer: <https://biology-forums.com/index.php?topic=1900255>

### Question 1650

Provide the structure of trifluoroacetic anhydride.

Answer: <https://biology-forums.com/index.php?topic=1898972>

### Question 1651

In solution, glucose exists as \_\_\_\_\_.

- the open-chain form only
- an equilibrium mixture of the open-chain form and cyclic hemiacetal forms
- the cyclic hemiacetal form only
- an equilibrium mixture of the open-chain form and cyclic acetal forms

Answer: <https://biology-forums.com/index.php?topic=1899867>

### Question 1652

What complex results when BF<sub>3</sub> is dissolved in dimethyl ether?

Answer: <https://biology-forums.com/index.php?topic=1899485>

### Question 1653

The final product is a derivative of Amonafide, a drug used to treat breast cancer (J. Med. Chem. 2007, 4122). Complete each step of the synthesis by filling in the necessary reagents.

Answer: <https://biology-forums.com/index.php?topic=1898843>

### Question 1654

The <sup>1</sup>H NMR spectrum of ethanol is acquired and the hydroxyl signal appears as a singlet instead of a triplet. Offer an explanation.

Answer: <https://biology-forums.com/index.php?topic=1899357>

### Question 1655

Which of the following reagents can be used to convert a carboxylic acid directly into its corresponding acid chloride derivative?

- HCl
- CH<sub>3</sub>Cl

- $\text{CH}_3\text{COCl}$
- $(\text{COCl})_2$
- $\text{NaOCl}$

Answer: <https://biology-forums.com/index.php?topic=1898955>

### Question 1656

One or more of the atoms in the structure shown should have nonzero formal charges. Redraw the structure and the atoms with non-zero formal charges.

Answer: <https://biology-forums.com/index.php?topic=1897174>

### Question 1657

Provide the reagents necessary to convert 3-methyl-2-butanol to 2-methyl-2-butanol.

Answer: <https://biology-forums.com/index.php?topic=1898065>

### Question 1658

Provide the structure of 2,4-dimethylpyridine.

Answer: <https://biology-forums.com/index.php?topic=1898740>

### Question 1659

Why do soaps work poorly in hard water?

Answer: <https://biology-forums.com/index.php?topic=1900168>

### Question 1660

In the boat conformation of cyclohexane, the "flagpole" hydrogens are located \_\_\_\_\_.

- on C-1 and C-4
- on C-1 and C-3
- on adjacent carbons
- on the same carbon
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1897443>

### Question 1661

Provide the structure of the predominant form of alanine present in an aqueous solution at a pH of 2.0.

Answer: <https://biology-forums.com/index.php?topic=1899993>

### Question 1662

Rank the following compounds in order of their propensity to become a hydrate in water (i.e., start with the least easy to hydrate:  $\text{CH}_3\text{COCH}_2\text{CH}_3$ ,  $\text{H}_2\text{CO}$ ,  $\text{Cl}_3\text{CCHO}$ , and  $\text{CH}_3\text{CH}_2\text{CHO}$ ).

Answer: <https://biology-forums.com/index.php?topic=1898683>

### Question 1663

The mass spectrum of alcohols often fail to exhibit detectable  $\text{M}^+$  peaks but instead show relatively large \_\_\_\_\_ peaks.

- $\text{M}-17$
- $\text{M}-16$
- $\text{M}+2$
- $\text{M}+1$
- $\text{M}-18$

Answer: <https://biology-forums.com/index.php?topic=1899308>

### Question 1664

Provide the structure of the sulfonium salt that results when  $(\text{CH}_3\text{CH}_2)_2\text{S}$  reacts with  $\text{CH}_3\text{CH}_2\text{Cl}$ . Through what mechanistic path is this reaction occurring?

Answer: <https://biology-forums.com/index.php?topic=1899550>

### Question 1665

Provide the structure of the monomer from which polypropylene is formed.

Answer: <https://biology-forums.com/index.php?topic=1900215>

### Question 1666

One product which results when 2-chloro-2-methylpentane is heated in ethanol is an ether. From which mechanistic pathway does this ether arise?

- E2
- SN1
- E1
- SN2
- E1cb

Answer: <https://biology-forums.com/index.php?topic=1897877>

### Question 1667

How could IR spectroscopy be used to distinguish between the following pair of compounds?

CH<sub>3</sub>OCH<sub>2</sub>CH<sub>3</sub> and CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH

Answer: <https://biology-forums.com/index.php?topic=1899274>

### Question 1668

Which is more soluble in water?

Answer: <https://biology-forums.com/index.php?topic=1897335>

### Question 1669

How would one use a Grignard-based synthesis to accomplish the following transformation?

methyl isobutyrate [(CH<sub>3</sub>)<sub>2</sub>CHCO<sub>2</sub>CH<sub>3</sub>] to 3-ethyl-2-methylpentan-3-ol

Answer: <https://biology-forums.com/index.php?topic=1898375>

### Question 1670

Amino acids have \_\_\_\_\_.

- low solubility in water and small dipole moments
- high melting points and low solubility in water
- large dipole moments and are more acidic than most carboxylic acids
- high melting points and large dipole moments
- small dipole moments and are hydrophobic

Answer: <https://biology-forums.com/index.php?topic=1899983>

### Question 1671

The compound phenol is shown below. Provide the structure of the conjugate base of phenol.

Answer: <https://biology-forums.com/index.php?topic=1897214>

### Question 1672

Provide the structure of the predominant form of L-phenylalanine present in an aqueous solution at biological pH, pH = 7.4.

Answer: <https://biology-forums.com/index.php?topic=1900003>

### Question 1673

Lithium aluminum hydride reduces carboxylic acids, acid chlorides, and esters to \_\_\_\_\_.

- secondary alcohols
- tertiary alcohols
- primary alcohols
- aldehydes
- ketones

Answer: <https://biology-forums.com/index.php?topic=1899030>

### Question 1674

How many peaks are in the proton spin decoupled <sup>13</sup>C NMR spectrum of p-dichlorobenzene?

- 2
- 3
- 4
- 5
- 6



Answer: <https://biology-forums.com/index.php?topic=1899827>

### Question 1675

Which of the following statements correctly describe(s) E1 reactions of alkyl halides (RX)?

I. Rate =  $k[\text{base}]$  II. Rate =  $k[\text{base}][\text{RX}]$  III. Rate =  $k[\text{RX}]$  IV. The reactions occur in two or more distinct steps. V. Rearrangements are sometimes seen.

- II and IV
- III, IV, and V
- III and V
- I only
- I, IV, and V

Answer: <https://biology-forums.com/index.php?topic=1897842>

### Question 1676

At approximately what wavenumber does one expect to find the carbon-carbon triple bond stretch in the IR spectrum of an alkyne?

Answer: <https://biology-forums.com/index.php?topic=1899216>

### Question 1677

Classify neoprene, shown below, as either being an addition polymer or condensation polymer. Justify your answer.

Answer: <https://biology-forums.com/index.php?topic=1900295>

### Question 1678

Provide a reasonable synthesis of Gly-Val from the individual amino acids.

Answer: <https://biology-forums.com/index.php?topic=1900071>

### Question 1679

SN1 reactions usually proceed with \_\_\_\_\_.

- equal amounts of inversion and retention at the center undergoing substitution
- complete inversion at the center undergoing substitution
- slightly more retention than inversion at the center undergoing substitution
- slightly more inversion than retention at the center undergoing substitution
- complete retention at the center undergoing substitution

Answer: <https://biology-forums.com/index.php?topic=1897833>

### Question 1680

Propose a synthesis of 3-heptanone from propanal.

Answer: <https://biology-forums.com/index.php?topic=1898664>

### Question 1681

Free radical bromination of pentane results in poor yields of 1-bromopentane, while cyclopentane can be readily brominated under similar conditions to yield bromocyclopentane. Offer an explanation.

Answer: <https://biology-forums.com/index.php?topic=1897575>

### Question 1682

Identify the statement that correctly describes methanol.

- It is also referred to as rubbing alcohol.
- It once was used as an anesthetic.
- It is used in alcoholic beverages.
- It can be used as a fuel source but releases less energy than gasoline when combusted.

Answer: <https://biology-forums.com/index.php?topic=1898329>

### Question 1683

Lithium aluminum hydride reduces carboxylic acids to primary alcohols via what intermediate?

- an aldehyde
- a methyl ester
- a secondary alcohol
- a ketone
- an acid chloride

Answer: <https://biology-forums.com/index.php?topic=1898945>

### Question 1684

Add the appropriate formal charge to each atom in the molecule below. It is not necessary to indicate formal charges when zero. (All non-bonding electrons are included.)

Answer: <https://biology-forums.com/index.php?topic=1897173>

### Question 1685

Provide a structure for the major substitution and major elimination product resulting from the reaction below.

Answer: <https://biology-forums.com/index.php?topic=1897854>

### Question 1686

Consider 1,2-dibromoethene, shown below. Use arrows to represent the individual bond dipoles. Would you expect this molecule to be polar? Briefly explain your reasoning.

Answer: <https://biology-forums.com/index.php?topic=1897333>

### Question 1687

All proteins have a quaternary structure.

- true
- false

Answer: <https://biology-forums.com/index.php?topic=1900077>

### Question 1688

Provide a synthesis of racemic valine from 3-methylbutanoic acid.

Answer: <https://biology-forums.com/index.php?topic=1900019>

### Question 1689

Provide a detailed, stepwise mechanism for the reaction of acetyl chloride with methanol to produce methyl acetate and HCl.

Answer: <https://biology-forums.com/index.php?topic=1898959>

### Question 1690

What type of linkage bonds the individual nucleotides together in DNA?

Answer: <https://biology-forums.com/index.php?topic=1898507>

### Question 1691

Draw an acceptable structure for 1,2-dimethylcyclohexene.

Answer: <https://biology-forums.com/index.php?topic=1897918>

### Question 1692

Cyclohexane has a molecular formula of C<sub>6</sub>H<sub>12</sub> and an unsaturation number of 1. Is this compound considered to be unsaturated? Why or why not?

Answer: <https://biology-forums.com/index.php?topic=1898018>

### Question 1693

Provide the structure of 3-nitrothalic acid.

Answer: <https://biology-forums.com/index.php?topic=1898862>

### Question 1694

Which of the following compounds will react most rapidly when treated with CH<sub>3</sub>CH<sub>2</sub>Cl and AlCl<sub>3</sub>?

- nitrobenzene
- toluene
- anisole
- benzene
- chlorobenzene

Answer: <https://biology-forums.com/index.php?topic=1898544>

### Question 1695

Which of the following will alkylate a lithium enolate most rapidly?

- bromobenzene
- methyl bromide
- neopentyl bromide
- isopropyl bromide
- 2-methylbromobenzene

Answer: <https://biology-forums.com/index.php?topic=1899099>

### Question 1696

Which of the following incorrectly describes cis-1,2-dimethylcyclopentane?

- It has an enantiomer.
- Its diastereomer is trans-1,2-dimethylcyclopentane.
- It contains two asymmetric carbons.
- It is achiral.
- It is a meso compound.

Answer: <https://biology-forums.com/index.php?topic=1897610>

### Question 1697

When 3-bromobut-1-ene is heated in a good ionizing solvent, reactions occur through a carbocation intermediate. Draw all reasonable resonance contributors of this cation and indicate which is the major contributor.

Answer: <https://biology-forums.com/index.php?topic=1899610>

### Question 1698

Provide the structure of uridine.

Answer: <https://biology-forums.com/index.php?topic=1899949>

### Question 1699

Provide the structure of (Z)-1-chloro-1-fluoro-1-butene.

Answer: <https://biology-forums.com/index.php?topic=1897932>

### Question 1700

Treatment of cyclopentene with peroxybenzoic acid \_\_\_\_\_.

- yields an equimolar mixture of enantiomeric epoxides
- yields a meso epoxide
- results in oxidative cleavage of the ring to produce an acyclic compound
- gives the same product as treatment of cyclopentene with OsO<sub>4</sub>
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898112>

### Question 1701

Before Edman degradation, Fredrick Sanger developed the first method to analyze the N-terminal amino acid of a protein using 2,4-dinitrofluorobenzene in the following reaction. Propose a mechanism for this reaction.

Answer: <https://biology-forums.com/index.php?topic=1900059>

### Question 1702

How many carbons do the primary alkane constituents of gasoline contain?

- C12—C16
- C1—C2
- C5—C8
- C8—C12
- C3—C4

Answer: <https://biology-forums.com/index.php?topic=1897398>

### Question 1703

Does 1,1-dichloroethene (Cl<sub>2</sub>CCH<sub>2</sub>) have a net molecular dipole moment? If it does, draw the molecule and indicate the direction of this molecular

dipole moment.

Answer: <https://biology-forums.com/index.php?topic=1897289>

### Question 1704

Provide the structure of the major organic product which results when  $\text{PhCO}_2\text{CH}_2\text{CH}_3$  and  $\text{CH}_3\text{CH}_2\text{CO}_2\text{CH}_2\text{CH}_3$  are heated in the presence of sodium ethoxide and the compound generated is subsequently treated with cold, dilute acid.

Answer: <https://biology-forums.com/index.php?topic=1899160>

### Question 1705

Give the IUPAC name for  $\text{CH}_3\text{CH}_2\text{CCCH}(\text{OH})\text{CH}_3$ .

Answer: <https://biology-forums.com/index.php?topic=1898153>

### Question 1706

Suggest a sequence of synthetic steps through which 2-phenylethanol can be prepared from toluene. One of your intermediates must be a carboxylic acid.

Answer: <https://biology-forums.com/index.php?topic=1898946>

### Question 1707

What IR stretch would most readily distinguish carnauba wax from paraffin wax?

Answer: <https://biology-forums.com/index.php?topic=1900098>

### Question 1708

What diene and dienophile are used in the Diels-Alder route to the compound shown?

[html]What diene and dienophile are used in the Diels-Alder route to the compound shown?

[/html]

Answer: <https://biology-forums.com/index.php?topic=1899660>

### Question 1709

Phthalic acid produces what acid derivative upon heating?

- an anhydride
- a carboxylate
- an ester
- an acid chloride
- an amide

Answer: <https://biology-forums.com/index.php?topic=1899049>

### Question 1710

When ethylene is polymerized by free-radical initiation, what type of polyethylene is formed?

- low-density; highly branched
- high-density; highly branched
- high-density; unbranched and highly linear
- low-density; unbranched and highly linear
- high-density; highly crystalline

Answer: <https://biology-forums.com/index.php?topic=1900240>

### Question 1711

Are carboxylic acids of more than 10 carbons more soluble in polar or nonpolar solvents?

Answer: <https://biology-forums.com/index.php?topic=1898872>

### Question 1712

Which of the compounds below has a  $\text{pK}_a$  that most closely matches the  $\text{pK}_a$  of ethanol?

- water
- ammonia
- HCl
- acetic acid
- phenol

Answer: <https://biology-forums.com/index.php?topic=1898332>

### Question 1713

Draw the structure of polyethylene.

Answer: <https://biology-forums.com/index.php?topic=1897940>

### Question 1714

Cellulose and amylose are \_\_\_\_\_.

- 1,4' linked polymers of D-glucose which differ in the stereochemistry of this linkage
- polymers of D-galactose which are structurally isomeric
- synonyms for the only polymeric form of D-glucose
- polymers of D-glucose which are structurally isomeric
- 1,6' linked polymers of D-glucose which differ in the stereochemistry of this linkage

Answer: <https://biology-forums.com/index.php?topic=1899943>

### Question 1715

Lauric acid has the formula  $\text{CH}_3(\text{CH}_2)_{10}\text{CO}_2\text{H}$ . Provide the structure of the triglyceride which was formed from three equivalents of lauric acid.

Answer: <https://biology-forums.com/index.php?topic=1900119>

### Question 1716

Is the molecule shown below chiral or achiral?



Answer: <https://biology-forums.com/index.php?topic=1897614>

### Question 1717

Provide the name of the major organic product that results when cyclopentanol is subjected to the following sequence of reactions: 1.  $\text{TsCl}$ , pyridine; 2.  $\text{LiAlH}_4$ .

Answer: <https://biology-forums.com/index.php?topic=1898453>

### Question 1718

Triacontane is an unbranched alkane that contains 30 carbon atoms in each molecule. How many hydrogen atoms are present in each molecule of triacontane?

- 30
- 32
- 58
- 60
- 62

Answer: <https://biology-forums.com/index.php?topic=1897348>

### Question 1719

List the following bromides in order of their increasing reactivity as substrates in  $\text{S}_\text{N}2$  reactions:  $\text{PhBr}$ ,  $\text{PhCH}_2\text{Br}$ , and  $\text{PhCH}(\text{CH}_3)\text{Br}$ .

Answer: <https://biology-forums.com/index.php?topic=1897802>

### Question 1720

The positively polarized carbon atom of a carbonyl group acts as \_\_\_\_\_.

- a nucleophile and a Lewis base
- both a Lewis acid and a Lewis base
- an electrophile and a Lewis acid
- an electrophile and a Lewis base
- a nucleophile and a Lewis acid

Answer: <https://biology-forums.com/index.php?topic=1898623>

### Question 1721

Draw a mechanism and provide the structure of the aldol product that results when 4-methylpentanal is heated with sodium hydroxide.

Answer: <https://biology-forums.com/index.php?topic=1899131>

### Question 1722

Give a detailed, stepwise mechanism for the Fischer esterification of acetic acid with methanol.

Answer: <https://biology-forums.com/index.php?topic=1898934>

### Question 1723

A student named the following molecule "4-isobutylheptane." Why is this incorrect? What is the correct name?

Answer: <https://biology-forums.com/index.php?topic=1897357>

### Question 1724

Provide the structure of syndiotactic polystyrene.

Answer: <https://biology-forums.com/index.php?topic=1900260>

### Question 1725

Dicyclopentadiene results when cyclopentadiene reacts with itself in a Diels-Alder reaction. Provide the structure of dicyclopentadiene. Pay particular attention to stereochemical detail.

Answer: <https://biology-forums.com/index.php?topic=1899682>

### Question 1726

Draw the complete Lewis structure for the compound whose condensed formula is  $(\text{CH}_3)_2\text{CHCHO}$ .

Answer: <https://biology-forums.com/index.php?topic=1897192>

### Question 1727

List the following compounds in order of increasing reactivity in an  $\text{S}_{\text{N}}1$  reaction.

$\text{CH}_3\text{Br}$ ,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{I}$ ,  $(\text{CH}_3)_3\text{CI}$ ,  $\text{CH}_3\text{CHBrCH}_3$ ,  $\text{CH}_3\text{CHICH}_3$

Answer: <https://biology-forums.com/index.php?topic=1897824>

### Question 1728

What reagent is needed to complete the following transformation?

- $(\text{iPr})_2\text{CuLi}$
- $\text{iPrBr}$
- $\text{iPrMgBr}$
- $\text{iPrLi}$

Answer: <https://biology-forums.com/index.php?topic=1898360>

### Question 1729

Indicate the line-angle structure that corresponds to the condensed structure,  $\text{HOCH}_2\text{C}(\text{O})\text{CH}(\text{CH}_3)_2$ .

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1897196>

### Question 1730

Which one of the molecules shown below has a net molecular dipole moment?

- $\text{CO}_2$
- $\text{CCl}_4$
- $\text{BeCl}_2$
- $\text{CH}_3\text{CCl}_3$

Answer: <https://biology-forums.com/index.php?topic=1897288>

### Question 1731

A protein bonded to a sugar residue would be classified as a \_\_\_\_\_.

- lipoprotein
- metalloprotein
- nucleoprotein
- glycoprotein
- simple protein

Answer: <https://biology-forums.com/index.php?topic=1900075>

### Question 1732

In carbon NMR, the carbon atom of the carbonyl group in aldehydes and ketones has a chemical shift of about \_\_\_\_\_.

- 40 ppm
- 20 ppm
- 60 ppm
- 120 ppm
- 200 ppm

Answer: <https://biology-forums.com/index.php?topic=1898646>

### Question 1733

Which reagent could be used to perform the following reaction?

- Swern Oxidation
- DMP (periodane) reagent
- NaOCl/TEMPO
- All reagents will work

Answer: <https://biology-forums.com/index.php?topic=1898437>

### Question 1734

Treatment of 2-methylpropene with which of the following reaction conditions results in an anti-Markovnikov addition product?

- dry gaseous HBr with peroxides present
- BH<sub>3</sub>-THF, followed by alkaline H<sub>2</sub>O<sub>2</sub>
- aqueous Hg(OAc)<sub>2</sub>, followed by alkaline NaBH<sub>4</sub>
- dilute H<sub>2</sub>SO<sub>4</sub> and heat
- both A and B

Answer: <https://biology-forums.com/index.php?topic=1898067>

### Question 1735

Which of the following chemical reactions could be used to distinguish between a polyunsaturated vegetable oil and a petroleum oil containing a mixture of saturated and unsaturated hydrocarbons?

- ozonolysis
- hydrogenation
- lipidification
- addition of bromine in carbon tetrachloride
- saponification

Answer: <https://biology-forums.com/index.php?topic=1900156>

### Question 1736

Why can 1,2,2-trimethylaziridine be resolved into enantiomers while cannot?

Answer: <https://biology-forums.com/index.php?topic=1898766>

### Question 1737

Explain the stereochemical relationship, if any, among the following two structures and describe whether or not they could be theoretically isolated from each other. (Note: Some H atoms are omitted for clarity.)

Answer: <https://biology-forums.com/index.php?topic=1897687>

### Question 1738

Unlike other functional groups, ethers often show an absorption in the fingerprint region of the IR spectrum between \_\_\_\_\_.

- 1600 cm<sup>-1</sup>
- 3400 cm<sup>-1</sup>
- 600-800 cm<sup>-1</sup>
- 1000-1200 cm<sup>-1</sup>

Answer: <https://biology-forums.com/index.php?topic=1899530>

### Question 1739

Anisole, the compound shown below, is an example of \_\_\_\_\_.

- an ester
- a ketone

- an alcohol
- an aldehyde
- an ether

Answer: <https://biology-forums.com/index.php?topic=1897320>

### Question 1740

Which of the functional groups below contain a hydroxyl group as a part of their structure?

- aldehyde
- alcohol
- carboxylic acid
- amine
- B and C only

Answer: <https://biology-forums.com/index.php?topic=1897314>

### Question 1741

What cyclic products results when 1,8-nonadiene is treated with Grubbs catalyst?

Answer: <https://biology-forums.com/index.php?topic=1898134>

### Question 1742

Name the alcohol that would be used in the Fischer esterification synthesis of ethyl propanoate ( $\text{CH}_3\text{CH}_2\text{O}_2\text{CCH}_2\text{CH}_3$ ).

Answer: <https://biology-forums.com/index.php?topic=1898501>

### Question 1743

Which of the following structures is aromatic?

- 
- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1899739>

### Question 1744

2-Phenylethanol yields what acid upon treatment with cold chromic acid?

Answer: <https://biology-forums.com/index.php?topic=1898903>

### Question 1745

Provide the structure of the product which results when the alkene below is treated with  $\text{O}_3$  followed by  $(\text{CH}_3)_2\text{S}$ .

Answer: <https://biology-forums.com/index.php?topic=1898130>

### Question 1746

Oxidation of a  $3^\circ$  alcohol with chromic acid results in the production of \_\_\_\_\_.

- an aldehyde
- an ether
- a ketone
- an ester
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1898668>

### Question 1747

Draw the structure of (1R, 2R)-1-bromo-2-chlorocyclobutane. Take particular care to indicate stereochemistry properly.

Answer: <https://biology-forums.com/index.php?topic=1897660>

### Question 1748

Draw a correct Lewis structure for acetaldehyde,  $\text{CH}_3\text{CHO}$ .

Answer: <https://biology-forums.com/index.php?topic=1897205>



### Question 1749

Does this molecule have a mirror plane? If so, represent where the plane would be with a dashed line.

Answer: <https://biology-forums.com/index.php?topic=1897621>

### Question 1750

Provide the structure of the compound which reacts with a ketone to form its hydrazone derivative.

Answer: <https://biology-forums.com/index.php?topic=1898705>

### Question 1751

Provide the Lewis structure of the conjugate acid of ethanol (CH<sub>3</sub>CH<sub>2</sub>OH).

Answer: <https://biology-forums.com/index.php?topic=1897218>

### Question 1752

Which of the following must be converted into a carboxylic acid through nitrile hydrolysis rather than through a Grignard synthesis with Mg/ether followed with dry CO<sub>2</sub> and work-up with H<sub>3</sub>O<sup>+</sup>?

Answer: <https://biology-forums.com/index.php?topic=1898909>

### Question 1753

Ruff degradation of D-glucose followed by oxidation with nitric acid yields the same aldaric acid as does \_\_\_\_\_ when it is treated with nitric acid.

- L-xylose
- D-arabinose
- D-xylose
- L-arabinose
- D-lyxose

Answer: <https://biology-forums.com/index.php?topic=1899926>

### Question 1754

Which of the following correctly describes the structural relationship between D-ribose and L-lyxose?

- diastereomers but not epimers
- diastereomers and epimers
- not isomers
- constitutional isomers
- enantiomers

Answer: <https://biology-forums.com/index.php?topic=1899862>

### Question 1755

Predict the product of the following intramolecular Heck reaction (Synthesis, 2002, 28, 87).

Answer: <https://biology-forums.com/index.php?topic=1898602>

### Question 1756

Can the molecule shown below be properly described as a meso compound?

(CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>CH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1897724>

### Question 1757

A correct order of reactivity of acid derivatives towards nucleophilic attack is \_\_\_\_\_.

- carboxylates > esters > amides
- anhydrides > acids > acid chlorides
- esters > acid anhydrides > amides
- anhydrides > amides > esters
- anhydrides > amides > carboxylates

Answer: <https://biology-forums.com/index.php?topic=1899003>

### Question 1758

Which one of these alkene would be likely to experience a carbocation rearrangement when treated with aqueous acid?

- 
- None of these would undergo a rearrangement.
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1898054>

### Question 1759

Rank the following compounds in order of increasing reactivity towards chlorination with  $\text{Cl}_2/\text{AlCl}_3$  (slowest reacting to fastest).

- $3 < 4 < 2 < 1 < 5$
- $2 < 4 < 1 < 5 < 3$
- $4 < 2 < 1 < 3 < 5$
- $2 < 4 < 5 < 1 < 3$
- $2 < 4 < 1 < 3 < 5$

Answer: <https://biology-forums.com/index.php?topic=1898561>

### Question 1760

Calculate the molecular formula for the organic compound whose quantitative elemental analysis showed 48.6% carbon and 8.1% hydrogen by weight.

- $\text{C}_2\text{H}_6$
- $\text{C}_3\text{H}_6\text{O}$
- $\text{C}_3\text{H}_6\text{O}_2$
- $\text{CH}_2\text{O}$
- $\text{C}_2\text{H}_4\text{O}_2$

Answer: <https://biology-forums.com/index.php?topic=1897121>

### Question 1761

Draw the structure of (S)-1-bromo-1-chloropropane. Take particular care to indicate three-dimensional stereochemical detail properly.

Answer: <https://biology-forums.com/index.php?topic=1897649>

### Question 1762

The following structure has been used in monitoring the development of amyloid plaques in Alzheimer's patients (J. Med. Chem. 2011, 949). Which sequence correctly ranks the following nitrogens in order of increasing  $\text{pK}_b$  value?

- $1 < 3 < 2$
- $2 < 3 < 1$
- $3 < 2 < 1$
- $2 < 1 < 3$

Answer: <https://biology-forums.com/index.php?topic=1898775>

### Question 1763

Draw the hydrogen bonding that takes place between H-F and dimethyl ether  $\text{CH}_3\text{OCH}_3$ .

Answer: <https://biology-forums.com/index.php?topic=1897301>

### Question 1764

Electrophilic iodination of benzene requires which reagent in addition to  $\text{I}_2$ ?

Answer: <https://biology-forums.com/index.php?topic=1898534>

### Question 1765

Why is rotation about the carbon-carbon double bond in alkenes prohibited while relatively free rotation can occur about the carbon-carbon single bond in alkanes?

Answer: <https://biology-forums.com/index.php?topic=1897892>

### Question 1766

Which of the following amino acids has a side chain which contains a nonbasic nitrogen?

- histidine
- tyrosine
- proline
- glutamine
- lysine

Answer: <https://biology-forums.com/index.php?topic=1899974>

### Question 1767

How would you perform the following transformation using a Michael addition?

Answer: <https://biology-forums.com/index.php?topic=1899190>

### Question 1768

Provide a detailed, stepwise mechanism for the reaction of acetyl chloride (CH<sub>3</sub>COCl) and 2 equivalents of PhMgCl.

Answer: <https://biology-forums.com/index.php?topic=1898386>

### Question 1769

Provide the reagents necessary for carrying out the transformation of 2-methylheptane to 2-methylhept-1-ene.

Answer: <https://biology-forums.com/index.php?topic=1897995>

### Question 1770

What type of carbon environment does not generate a signal in the DEPT-90 spectrum and gives a negative signal in the DEPT-135 spectrum?

- quaternary
- methine
- methylene
- methyl
- carbonyl

Answer: <https://biology-forums.com/index.php?topic=1899364>

### Question 1771

\_\_\_\_\_ is a common biological intermediate and is the biosynthetic precursor to other steroids.

Answer: <https://biology-forums.com/index.php?topic=1900188>

### Question 1772

What is the IUPAC name of the compound shown below?

- (1R,3S)-1,3-dichloro-1-ethyl-3-methylcyclopentane
- (1R,3S)-1,3-dichloro-1-methyl-3-ethylcyclopentane
- (1S,3R)-1,3-dichloro-3-ethyl-1-methylcyclopentane
- (1R,4S)-1,4-dichloro-1-ethyl-4-methylcyclopentane
- (1S,3S)-1,3-dichloro-1-ethyl-3-methylcyclopentane

Answer: <https://biology-forums.com/index.php?topic=1897764>

### Question 1773

What nucleophilic carbon species is used in the Kiliani-Fischer synthesis?

Answer: <https://biology-forums.com/index.php?topic=1899932>

### Question 1774

Provide the IUPAC name for HO<sub>2</sub>CCH<sub>2</sub>C(CH<sub>3</sub>)<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CO<sub>2</sub>H.

Answer: <https://biology-forums.com/index.php?topic=1898856>

### Question 1775

A molecule of acetylene (C<sub>2</sub>H<sub>2</sub>) has a \_\_\_\_\_ geometry and a molecular dipole moment that is \_\_\_\_\_.

- tetrahedral; nonzero
- bent; zero
- bent; nonzero
- linear; nonzero
- linear; zero

Answer: <https://biology-forums.com/index.php?topic=1897285>

### Question 1776

If triolein (oleic acid: CH<sub>3</sub>(CH<sub>2</sub>)<sub>7</sub>CH=CH(CH<sub>2</sub>)<sub>7</sub>COOH) was reacted with hydrogen in the presence of a transition metal catalyst, what would the new product be and how would the properties of the new compound be different from triolein?

Answer: <https://biology-forums.com/index.php?topic=1900132>

### Question 1777

The most characteristic IR stretch of butanenitrile occurs at approximately what wavenumber?

- 3100 cm<sup>-1</sup>
- 3500 cm<sup>-1</sup>
- 2600 cm<sup>-1</sup>
- 1750 cm<sup>-1</sup>
- 2200 cm<sup>-1</sup>

Answer: <https://biology-forums.com/index.php?topic=1899000>

### Question 1778

Using pKa values, determine whether or not the following reaction will proceed to completion.

[html]Using pKa values, determine whether or not the following reaction will proceed to completion.

[/html]

[html]Using pKa values, determine whether or not the following reaction will proceed to completion.

[/html]

Answer: <https://biology-forums.com/index.php?topic=1898225>

### Question 1779

Draw the structure of poly(acrylonitrile).

Answer: <https://biology-forums.com/index.php?topic=1900226>

### Question 1780

Three halogenated organic products result from the reaction below. Draw the structure of each product and then circle the most stable product.

Answer: <https://biology-forums.com/index.php?topic=1899629>

### Question 1781

Which substrate would react most rapidly in an SN<sub>2</sub> reaction?

- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH=CHBr
- BrCH<sub>2</sub>CH<sub>2</sub>CH=CHCH<sub>3</sub>
- CH<sub>3</sub>CHBrCH=CH<sub>2</sub>CH<sub>3</sub>
- CH<sub>3</sub>CH<sub>2</sub>CH=CHCH<sub>2</sub>Br

Answer: <https://biology-forums.com/index.php?topic=1899645>

### Question 1782

When D-(+)-allose is treated with bromine water, which of the following results?

- a racemic mixture of aldaric acids
- an optically active aldaric acid
- an optically inactive aldaric acid
- an optically active aldonic acid
- an optically inactive aldonic acid

Answer: <https://biology-forums.com/index.php?topic=1899902>

### Question 1783

The formal charge on the nitrogen on the structure shown below is:

Answer: <https://biology-forums.com/index.php?topic=1897159>

### Question 1784

Provide a detailed, stepwise mechanism for the base-catalyzed hydration of 2-butanone.

Answer: <https://biology-forums.com/index.php?topic=1898685>

### Question 1785

Why are alkanes described as hydrophobic?

Answer: <https://biology-forums.com/index.php?topic=1897392>

### Question 1786

Which of the following terms best describes the compound below?

- a monoterpene
- a diterpene
- an unsaturated triglyceride
- a complex lipid
- a steroid

Answer: <https://biology-forums.com/index.php?topic=1900200>

### Question 1787

According to the following pKa values listed for a set of acids, which would lead to the strongest conjugate base?

- -2
- 1
- 25
- 50
- 7

Answer: <https://biology-forums.com/index.php?topic=1897132>

### Question 1788

Which of the following is a secondary amine?

- cyclohexylamine
- N,N-dimethylaniline
- 3-pentanamine
- methylamine
- N-ethyl-1-propanamine

Answer: <https://biology-forums.com/index.php?topic=1898757>

### Question 1789

How many nuclear spin states are allowed for the  $^1\text{H}$  nucleus?

- 2
- 4
- 10
- 1
- 3

Answer: <https://biology-forums.com/index.php?topic=1899314>

### Question 1790

Which atomic orbital combination would result in a molecular sigma bond?

- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1897230>

### Question 1791

How could you tell if the hydrogenation of 2-pentene to pentane was complete?

Answer: <https://biology-forums.com/index.php?topic=1899240>

### Question 1792

Which of the following terms best describes the structural relationship between Nylon 6 and Nylon 6,6?

- identical
- conformers
- diastereomers
- enantiomers
- structural isomers

Answer: <https://biology-forums.com/index.php?topic=1900320>

### Question 1793

Which of the following compounds is not a constitutional isomer of a compound with an empirical formula  $C_3H_7O$  and a formula mass of 118.164?

- 
- 
- 
- 
- 

Answer: <https://biology-forums.com/index.php?topic=1897277>

### Question 1794

Which has the higher boiling point, cis- or trans-hex-3-ene? Briefly explain your choice.

Answer: <https://biology-forums.com/index.php?topic=1897969>

### Question 1795

Why are terminal alkynes more acidic than other hydrocarbons?

Answer: <https://biology-forums.com/index.php?topic=1898221>

### Question 1796

Consider the reaction of  $(CH_3)_3CO^-$  with iodomethane. Will the reaction rate increase, decrease, or remain the same if the concentration of iodomethane is increased? Explain.

Answer: <https://biology-forums.com/index.php?topic=1897784>

### Question 1797

Name the alkene shown. Be sure to include the appropriate E or Z label necessary.

Answer: <https://biology-forums.com/index.php?topic=1897937>

### Question 1798

Place the following alkanes in order of increasing boiling point:

$CH_3(CH_2)_6CH_3$ ,  $CH_3(CH_2)_5CH_3$ ,  $(CH_3)_3CCH_2CH_2CH_3$

Answer: <https://biology-forums.com/index.php?topic=1897391>

### Question 1799

How does the O-H stretch in the IR spectrum of a carboxylic acid differ from the O-H stretch of an alcohol?

Answer: <https://biology-forums.com/index.php?topic=1898898>

### Question 1800

It is necessary to add  $ZnCl_2$  to promote the reaction of  $HCl$  with some alcohols while these same alcohols react with  $HBr$  quite readily. Explain.

Answer: <https://biology-forums.com/index.php?topic=1898466>

### Question 1801

Which of the following describes an unsymmetrical addition reaction?

- propyne with 1 mole  $Br_2$  in  $CCl_4$
- propyne with  $Na/NH_3$
- propyne with 1 mole  $HBr$
- propyne with 2 moles  $Cl_2$  in  $CCl_4$
- propyne with 1 mole  $H_2$ ,  $Ni$  and heat

Answer: <https://biology-forums.com/index.php?topic=1898247>

### Question 1802

Which of the halogens below undergoes free radical halogenation with ethane most rapidly?

- chlorine
- iodine
- pyridine
- bromine
- fluorine

Answer: <https://biology-forums.com/index.php?topic=1897562>

### Question 1803

The nitrogen's lone pair in pyrrolidine is best described as occupying what type of orbital?

- sp<sup>3</sup>
- sp
- sp<sup>2</sup>
- p
- s

Answer: <https://biology-forums.com/index.php?topic=1898762>

### Question 1804

Provide a detailed, stepwise mechanism for the acid-catalyzed condensation reaction between cyclohexanone and H<sub>2</sub>NOH.

Answer: <https://biology-forums.com/index.php?topic=1898710>

### Question 1805

What IR absorption is characteristic of the C=O stretch in aldehydes?

- 3300 cm<sup>-1</sup>
- 3500 cm<sup>-1</sup>
- 2250 cm<sup>-1</sup>
- 1710 cm<sup>-1</sup>
- 2950 cm<sup>-1</sup>

Answer: <https://biology-forums.com/index.php?topic=1899256>

### Question 1806

The following compound has been found effective in treating pain and inflammation (J. Med. Chem. 2007, 4222). Which sequence correctly ranks each carbonyl group in order of increasing reactivity toward nucleophilic addition?

- 2 < 3 < 1
- 3 < 1 < 2
- 1 < 2 < 3
- 1 < 3 < 2

Answer: <https://biology-forums.com/index.php?topic=1898681>

### Question 1807

Propose a synthesis of benzonitrile from benzene and any other necessary reagents.

Answer: <https://biology-forums.com/index.php?topic=1899067>

### Question 1808

While the carbonyl stretching frequency for simple aldehydes, ketones, and carboxylic acids is about 1710 cm<sup>-1</sup>, the carbonyl stretching frequency for esters is about \_\_\_\_\_.

- 1660 cm<sup>-1</sup>
- 1800 cm<sup>-1</sup>
- 1735 cm<sup>-1</sup>
- 1700 cm<sup>-1</sup>
- 2200 cm<sup>-1</sup>

Answer: <https://biology-forums.com/index.php?topic=1898995>

### Question 1809

When a ketone and its enol are in equilibrium, under most conditions the concentration of the enol is \_\_\_\_\_ the concentration of the ketone.

- much higher than
- exactly half of
- equal to
- much lower than
- slightly higher than

Answer: <https://biology-forums.com/index.php?topic=1899097>

### Question 1810

Draw any diastereomer of the molecule shown below.

Answer: <https://biology-forums.com/index.php?topic=1897705>

### Question 1811

When 1-iodo-1-methylcyclohexane is treated with  $\text{NaOCH}_2\text{CH}_3$ , the more highly substituted alkene product predominates. When  $\text{KOC}(\text{CH}_3)_3$  is used instead, the less highly substituted alkene product predominates. Offer an explanation.

Answer: <https://biology-forums.com/index.php?topic=1897859>

### Question 1812

Can one predict whether a compound with a single asymmetric carbon is dextro- or levorotatory based on the R/S assignment at this asymmetric carbon? Explain briefly.

Answer: <https://biology-forums.com/index.php?topic=1897677>

### Question 1813

Arrange the following compounds in order of increasing boiling point:

ethyl methyl ether, 1-propanol, N-methylethanamine, and 1-propanamine.

Answer: <https://biology-forums.com/index.php?topic=1898768>

### Question 1814

Which of the following correctly lists the conformations of cyclohexane in order of increasing energy?

- chair < twist < boat < half-chair
- half-chair < twist < boat < chair
- chair < boat < twist < half-chair
- half-chair < boat < twist < chair
- chair < twist < half-chair < boat

Answer: <https://biology-forums.com/index.php?topic=1897444>

### Question 1815

How can the electrophilicity of hydroxyls be increased? Suggest several specific ways.

Answer: <https://biology-forums.com/index.php?topic=1898457>

### Question 1816

List the following alkyl halides in order of their increasing reactivity as substrates in  $\text{S}_\text{N}2$  reactions: 2-chlorobutane, 2-iodobutane, and 1-iodobutane.

Answer: <https://biology-forums.com/index.php?topic=1897803>

### Question 1817

Draw the Fischer projection of L-glutamic acid at a pH of 2.

Answer: <https://biology-forums.com/index.php?topic=1899999>

### Question 1818

Physostigmine is used in the treatment of glaucoma. Within this structure, the atom indicated by \_\_\_\_\_ is most basic, while atom \_\_\_\_\_ is least basic.

- 1 (most basic), 3 (least basic)
- 1 (most basic), 4 (least basic)
- 2 (most basic), 3 (least basic)
- 2 (most basic), 4 (least basic)
- None of the above

Answer: <https://biology-forums.com/index.php?topic=1898778>

### Question 1819

If a monocyclic alkane hydrocarbon contains n carbon atoms, how many hydrogen atoms must it also contain?

- n - 2
- n
- 2n
- n + 2
- 2n + 2

Answer: <https://biology-forums.com/index.php?topic=1897427>

### Question 1820

Draw the 2 organic products expected from this reaction, label them as thermodynamic or kinetic and tell which predominates at  $-80^\circ\text{C}$ .



Answer: <https://biology-forums.com/index.php?topic=1899627>

### Question 1821

Which of the following cycloalkanes exhibits the greatest molar heat of combustion?

- cyclobutane
- cyclooctane
- cycloheptane
- cyclopropane
- cyclohexane

Answer: <https://biology-forums.com/index.php?topic=1897435>

### Question 1822

Circle the most stable alkene in the set of isomers below.

Answer: <https://biology-forums.com/index.php?topic=1897954>

### Question 1823

Draw a complete Lewis structure, including lone pairs, for  $(\text{CH}_3)_2\text{CHCO}_2\text{H}$ .

Answer: <https://biology-forums.com/index.php?topic=1897194>

### Question 1824

Which of the following condensed formulas represents the same compound as the line-angle structure shown?

- $\text{CH}_3\text{CH}_2\text{OCH}_2\text{N}(\text{CH}_2\text{CH}_2\text{CH}_3)_2$
- $\text{CH}_3\text{CH}_2\text{OCH}_2\text{N}(\text{CH}_2\text{CH}_3)_2$
- $\text{CH}_3\text{ON}(\text{CH}_3)_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{N}(\text{CH}_2\text{CH}_2\text{CH}_3)_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{N}(\text{CH}_2\text{CH}_3)_2$

Answer: <https://biology-forums.com/index.php?topic=1897195>

### Question 1825

Which sequence ranks the following isomers in order of increasing boiling points?

- 2

### Question 1826

How might the presence of an N-H functionality be indicated using NMR spectroscopy?

Answer: <https://biology-forums.com/index.php?topic=1898789>

### Question 1827

From the perspective of viewing down the C2-C3 bond, draw the Newman projection of the least stable conformation of 2,3-dimethylbutane.

Answer: <https://biology-forums.com/index.php?topic=1897425>

### Question 1828

Draw an acceptable structure for 4-tert-butyl-octane.

Answer: <https://biology-forums.com/index.php?topic=1897355>

### Question 1829

Below  $T_g$ , crystalline polymers exist as \_\_\_\_\_.

- thermoplastics which are flexible and moldable
- liquids which are flexible and moldable
- glasses of low flexibility
- thermoplastics which are readily extruded to form fibers
- liquids which are readily extruded to form fibers

Answer: <https://biology-forums.com/index.php?topic=1900331>

### Question 1830

In a globular protein, would the side chain of aspartic acid most probably be oriented toward the interior of the protein or outward toward the aqueous surroundings? Explain.

Answer: <https://biology-forums.com/index.php?topic=1900084>

### Question 1831

Which sequence correctly ranks the regions of the electromagnetic spectrum in order of increasing energy?

1) infrared 2) ultraviolet 3) radio wave

- $2 < 1 < 3$
- $1 < 3 < 2$
- $3 < 1 < 2$
- $3 < 2 < 1$

Answer: <https://biology-forums.com/index.php?topic=1899192>

### Question 1832

Propose a synthesis of methyl thioacetate from one carbon compounds and any other necessary inorganic reagents.

Answer: <https://biology-forums.com/index.php?topic=1899071>

### Question 1833

The compounds below are base pairs used to form supramolecular polymers (Org. Lett. 2011, 240). They are held together by three intermolecular hydrogen bonds and each contains one intramolecular hydrogen bond. Which atom in structure B forms a hydrogen bond with the circled hydrogen in structure A?

- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1897303>

### Question 1834

Which method gives you information about the N-terminus end of a peptide?

- Cleavage of disulfide linkages
- Chymotrypsin analysis
- Edman degradation
- Carboxypeptidase analysis

Answer: <https://biology-forums.com/index.php?topic=1900065>

### Question 1835

In the  $^{13}\text{C}$  NMR, in what region of the spectrum does one typically observe carbons which are part of the aromatic ring?

- -10-0 ppm
- 40-60 ppm
- 80-100 ppm
- 120-150 ppm
- 200-220 ppm

Answer: <https://biology-forums.com/index.php?topic=1899824>

### Question 1836

Which of the molecules below can be properly called an amine?

- $\text{CH}_3\text{COOH}$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{NO}_2$
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- $\text{CH}_3\text{CN}$
- $\text{CH}_3\text{CH}_2\text{NHCH}_3$

Answer: <https://biology-forums.com/index.php?topic=1897327>

### Question 1837

Provide a series of synthetic steps by which p-methylanisole can be prepared from p-cresol.

Answer: <https://biology-forums.com/index.php?topic=1898616>

### Question 1838

In a carboxylic acid, the hybridization of the C is \_\_\_\_\_ and the OCO bond angle is \_\_\_\_\_.

- $\text{sp}^3$ ; less than  $120^\circ$
- $\text{sp}^2$ ; exactly  $120^\circ$

- sp<sup>2</sup>; greater than 120°
- sp<sup>3</sup>; 109.5°

Answer: <https://biology-forums.com/index.php?topic=1898893>

### Question 1839

What is the major organic product that results when 1-heptyne is treated with 2 equivalents of HBr?

- 2,3-dibromo-2-heptene
- 1,2-dibromoheptane
- 1,1-dibromoheptane
- 2,3-dibromo-1-heptene
- 2,2-dibromoheptane

Answer: <https://biology-forums.com/index.php?topic=1898259>

### Question 1840

Draw the product of the monochlorination of methane with Cl<sub>2</sub> in the presence of light or heat.

Answer: <https://biology-forums.com/index.php?topic=1897481>

### Question 1841

Which of the following structures are achiral and meso?

- 1
- 2
- 3
- 4

Answer: <https://biology-forums.com/index.php?topic=1897645>

### Question 1842

Which of the following fatty acids has the highest melting point?

- myristic acid
- lauric acid
- palmitic acid
- linoleic acid
- stearic acid

Answer: <https://biology-forums.com/index.php?topic=1900121>

### Question 1843

Is the molecule shown below chiral or achiral? Explain what this means.

Answer: <https://biology-forums.com/index.php?topic=1897689>

### Question 1844

Two D-aldopentoses give the same D-aldotetrose upon Ruff degradation. The two aldopentoses are \_\_\_\_\_.

- enantiomers
- C2 epimers
- meso compounds
- C4 epimers
- D-glucose and D-galactose

Answer: <https://biology-forums.com/index.php?topic=1899924>

### Question 1845

Explain why polyamides tend to be crystalline polymers.

Answer: <https://biology-forums.com/index.php?topic=1900338>

### Question 1846

The pI of alanine is 6.0. Draw the structure for the predominant form of leucine that exists in:

- an aqueous solution of pH = 4.0
- an aqueous solution of pH = 6.0
- an aqueous solution of pH = 8.0

Answer: <https://biology-forums.com/index.php?topic=1899989>

### Question 1847

Provide a detailed, stepwise mechanism to show how PhCHO is formed by the reaction of PhCOCl with LiAlH [O(CH<sub>3</sub>)<sub>3</sub>]<sub>3</sub>.

Answer: <https://biology-forums.com/index.php?topic=1898940>

### Question 1848

Among the butane conformers, which occur at energy minima on a graph of potential energy versus dihedral angle?

- anti only
- eclipsed and totally eclipsed
- gauche only
- gauche and anti
- eclipsed only

Answer: <https://biology-forums.com/index.php?topic=1897419>

### Question 1849

The frequency of the stretching vibration of a bond in IR spectroscopy depends on what two quantities?

- the stiffness of the bond and the electronegativity of the atoms
- the electronegativity of the atoms and the masses of the atoms
- the electronegativity of the atoms and the nuclear charges of the atoms
- the nuclear charges of the atoms and the atomic radii
- the masses of the atoms and the stiffness of the bond

Answer: <https://biology-forums.com/index.php?topic=1899217>

### Question 1850

In the formation of a triacylglyceride, what two functional groups chemically combine?

- alcohol and an aldehyde
- two different alcohols
- carboxylic acid and an amine
- alcohol and a ketone
- carboxylic acid and an alcohol

Answer: <https://biology-forums.com/index.php?topic=1900106>

### Question 1851

Which of the molecules below has the higher boiling point? Briefly explain your choice.

CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH or CH<sub>3</sub>CH<sub>2</sub>OCH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1897298>

### Question 1852

Which has the higher boiling point, diethyl ether or butan-1-ol? Briefly explain.

Answer: <https://biology-forums.com/index.php?topic=1899481>

### Question 1853

Distamycin and derivatives have exhibited antiviral, antibiotic, and antitumor activity by binding to the minor groove of DNA (J. Med. Chem. 2004, 2133). Place a line through each bond of distamycin that would be cleaved by acid hydrolysis.

Answer: <https://biology-forums.com/index.php?topic=1899029>

### Question 1854

Dacron is a \_\_\_\_\_.

- polyurethane
- polycarbonate
- polyester
- polyamide
- none of the above

Answer: <https://biology-forums.com/index.php?topic=1900285>

### Question 1855

If a mixture contains 75% of one compound and 25% of its enantiomer, what is the e.e. of the mixture?

- 3

- 75
- 25
- 100
- 50

Answer: <https://biology-forums.com/index.php?topic=1897682>

### Question 1856

Provide the structure of the compound which results when HCN adds to pentanal.

Answer: <https://biology-forums.com/index.php?topic=1898697>

### Question 1857

What element of ring strain exists in cyclooctane but not in cyclopropane?

Answer: <https://biology-forums.com/index.php?topic=1897430>

### Question 1858

Which of the following is a secondary alkyl halide?

- isobutyl chloride
- methyl bromide
- isopropyl chloride
- propyl bromide
- t-butyl iodide

Answer: <https://biology-forums.com/index.php?topic=1897762>

### Question 1859

SN2 reactions take place with \_\_\_\_\_ of stereochemistry at the center undergoing substitution.

Answer: <https://biology-forums.com/index.php?topic=1897810>

### Question 1860

Which of the following would not have a C-H stretch at about 3050 cm<sup>-1</sup>?

- 2-methyl-2-pentene
- 1-pentene
- 2-pentene
- 2,3-dimethyl-2-pentene
- 2,4-dimethyl-2-pentene

Answer: <https://biology-forums.com/index.php?topic=1899241>

### Question 1861

When isobutylene [CH<sub>2</sub>C(CH<sub>3</sub>)<sub>2</sub>] is treated with BF<sub>3</sub>, polyisobutylene is formed. Provide a step-by-step mechanism for this polymerization reaction.

Answer: <https://biology-forums.com/index.php?topic=1898132>

### Question 1862

The enzyme, alcohol dehydrogenase, which is produced by the liver, converts ethanol to \_\_\_\_\_, a normal body metabolite.

Answer: <https://biology-forums.com/index.php?topic=1898449>

### Question 1863

Provide the sequence of synthetic steps necessary to convert cyclohexanone into the compound shown below.

Answer: <https://biology-forums.com/index.php?topic=1899185>

### Question 1864

Reduction of a 2-ketohexose with NaBH<sub>4</sub> yields \_\_\_\_\_.

- a mixture of alditols
- a single aldohexose
- a mixture of cyclic hemiacetals
- a mixture of acetals
- a single pyranose

Answer: <https://biology-forums.com/index.php?topic=1899892>

### Question 1865

Draw the most stable conformation of trans-1,2-dimethylcyclohexane.

Answer: <https://biology-forums.com/index.php?topic=1897458>

### Question 1866

How would you make tryptophan using the Strecker Synthesis?

Answer: <https://biology-forums.com/index.php?topic=1900028>

### Question 1867

Which one of these alkene would be likely to experience a carbocation rearrangement when treated with  $\text{Hg}(\text{OAc})_2$  in water, followed by reaction with sodium borohydride?

- 
- 
- 
- None of these would undergo a rearrangement.

Answer: <https://biology-forums.com/index.php?topic=1898061>

### Question 1868

While the carbonyl stretching frequency for simple aldehydes, ketones, and carboxylic acids is about  $1710\text{ cm}^{-1}$ , the carbonyl stretching frequency for acid chlorides is about \_\_\_\_\_.

- $1735\text{ cm}^{-1}$
- $1700\text{ cm}^{-1}$
- $2200\text{ cm}^{-1}$
- $1660\text{ cm}^{-1}$
- $1800\text{ cm}^{-1}$

Answer: <https://biology-forums.com/index.php?topic=1898996>

### Question 1869

Provide a series of synthetic steps by which p-nitrophenol can be prepared from benzene.

Answer: <https://biology-forums.com/index.php?topic=1898608>

### Question 1870

Show the best way to prepare  $\text{CH}_3\text{OCH}(\text{CH}_3)_2$  by an  $\text{S}_\text{N}2$  reaction.

Answer: <https://biology-forums.com/index.php?topic=1897807>

### Question 1871

An \_\_\_\_\_ molecular ion peak usually indicates the presence of an odd number of nitrogen atoms in the molecule.

- intense
- absent
- even
- odd

Answer: <https://biology-forums.com/index.php?topic=1899292>

### Question 1872

Which of the following correctly describes the bond angle and hybridizations present in formaldehyde?

- C,  $\text{sp}^3$ ; O,  $\text{sp}^3$ ;  $\text{HCO}$ ,  $\sim 109.5^\circ$
- C,  $\text{sp}^2$ ; O,  $\text{sp}^3$ ;  $\text{HCO}$ ,  $\sim 120^\circ$
- C,  $\text{sp}^2$ ; O,  $\text{sp}^2$ ;  $\text{HCO}$ ,  $\sim 120^\circ$
- C,  $\text{sp}^2$ ; O,  $\text{sp}^2$ ;  $\text{HCO}$ ,  $\sim 109.5^\circ$
- C,  $\text{sp}^3$ ; O,  $\text{sp}^2$ ;  $\text{HCO}$ ,  $\sim 109.5^\circ$

Answer: <https://biology-forums.com/index.php?topic=1898622>

### Question 1873

To a solution of propyne in diethyl ether, one molar equivalent of  $\text{CH}_3\text{Li}$  was added and the resulting mixture was stirred for 0.5 hour. After this time, an excess of  $\text{D}_2\text{O}$  was added. Describe the major organic product(s) of this reaction.

- $\text{CD}_3\text{CCD}_3$
- $\text{CH}_3\text{CCD} + \text{CH}_4$
- $\text{CH}_3\text{CCCD}_3$

- CH<sub>3</sub>CCD + CH<sub>3</sub>D
- CH<sub>3</sub>CCCH<sub>3</sub>

Answer: <https://biology-forums.com/index.php?topic=1898218>

### Question 1874

Provide the structure of the fragment in the mass spectrum of dipropyl ether that results from a cleavage.

Answer: <https://biology-forums.com/index.php?topic=1899502>

### Question 1875

Can 2-methyl-2-butanamine be prepared in good yield from the reaction of ammonia with 2-bromo-2-methylbutane? Why or why not?

Answer: <https://biology-forums.com/index.php?topic=1898807>

### Question 1876

Which of the following compounds is the strongest acid?

- m-methoxybenzoic acid
- water
- p-bromobenzoic acid
- m-methylbenzoic acid
- p-nitrobenzoic acid

Answer: <https://biology-forums.com/index.php?topic=1898881>

### Question 1877

How many moles of carbon dioxide are generated when one mole of the compound shown is treated with warm, concentrated KMnO<sub>4</sub>?

- 1
- 2
- 3
- 4
- 8

Answer: <https://biology-forums.com/index.php?topic=1898117>

### Question 1878

Which of the following mechanisms (SN<sub>1</sub>, SN<sub>2</sub>, E1, E2) feature(s) a carbocation intermediate?

- E1 only
- E2 only
- SN<sub>1</sub> only
- SN<sub>2</sub> only
- both SN<sub>1</sub> and E1

Answer: <https://biology-forums.com/index.php?topic=1897870>

### Question 1879

Which of the following terms best describes the interior of a soap micelle in water?

- hydrophobic
- hard
- saponified
- hydrophilic
- hydrogenated

Answer: <https://biology-forums.com/index.php?topic=1900150>

### Question 1880

One of the stereoisomers of the following oblongolide structure is a natural product isolated from a fungus and has been found to contain antiviral and cytotoxic activities (J. Nat. Prod. 2010, 55). How many stereoisomers exist for this structure?

- 32
- 64
- 12
- 6

Answer: <https://biology-forums.com/index.php?topic=1897708>

### Question 1881

Through what basic mechanism is 1-methylcyclohexanol converted to 1-bromo-1-methylcyclohexane upon treatment with HBr?

- E1
- E2
- SN1
- SN2
- radical chain

Answer: <https://biology-forums.com/index.php?topic=1898467>

### Question 1882

Name the salt formed from the reaction of acetic acid with ammonia.

Answer: <https://biology-forums.com/index.php?topic=1898877>

### Question 1883

Using acid-base extractions, how might you purify a crude sample of benzoic acid?

Answer: <https://biology-forums.com/index.php?topic=1898892>

### Question 1884

Which of the following configurations corresponds to the structure below?

- (4S, 5S)
- (4R, 5R)
- (4S, 5R)
- (4R, 5S)

Answer: <https://biology-forums.com/index.php?topic=1897665>

### Question 1885

Why does the (E,E)-isomer of 2,4-hexadiene react much more rapidly with dienophiles than does the (Z,Z)-isomer?

Answer: <https://biology-forums.com/index.php?topic=1899680>

### Question 1886

Describe the benzenoid band which appears in the UV-visible spectrum of most aromatic hydrocarbons.

Answer: <https://biology-forums.com/index.php?topic=1899832>

### Question 1887

Write an equation to describe the initiation step in the chlorination of methane.

Answer: <https://biology-forums.com/index.php?topic=1897490>

### Question 1888

Using solely a fatty acid as your starting material, how would you synthesize a wax?

Answer: <https://biology-forums.com/index.php?topic=1900142>

### Question 1889

Show how one might prepare 3-methylpentane by beginning with 2-iodobutane and using a Gilman reagent.

Answer: <https://biology-forums.com/index.php?topic=1898381>

### Question 1890

According to the Lewis definition, which of the following may act as acids?

- NH<sub>3</sub>
- HCl
- AlCl<sub>3</sub>
- A & B
- A, B, & C

Answer: <https://biology-forums.com/index.php?topic=1897149>

### Question 1891

When 3,6-dimethylcyclohexene is reacted with dry gaseous HBr, one of the products is 1-bromo-1,4-dimethylcyclohexane. Provide a detailed step-by-step mechanism to explain the formation of this product.

Answer: <https://biology-forums.com/index.php?topic=1898039>

### Question 1892



Draw the four major resonance structures of the sigma complex intermediate in the reaction of anisole with HNO<sub>3</sub>/H<sub>2</sub>SO<sub>4</sub> to yield p-nitroanisole.

Answer: <https://biology-forums.com/index.php?topic=1898552>

### Question 1893

Draw the basic 4-ring skeletal structure found in steroids.

Answer: <https://biology-forums.com/index.php?topic=1900189>

### Question 1894

How could you convert cyclohexane to 1-methylcyclohexanol?

Answer: <https://biology-forums.com/index.php?topic=1898728>

### Question 1895

The formal charge on oxygen in dimethyl ether, CH<sub>3</sub>OCH<sub>3</sub>, is \_\_\_\_\_.

- +2
- +1
- 0
- -1
- -2

Answer: <https://biology-forums.com/index.php?topic=1897110>

### Question 1896

Draw an acetic acid dimer. Be sure to indicate the hydrogen bonds present.

Answer: <https://biology-forums.com/index.php?topic=1898873>

### Question 1897

Consider the equilibrium of each of the carbonyl compounds with HCN to produce cyanohydrins. Which is the correct ranking of compounds in order of increasing  $K_{eq}$  for this equilibrium?

- CH<sub>3</sub>CHO < 2-methylcyclohexanone < cyclohexanone < H<sub>2</sub>CO
- cyclohexanone < 2-methylcyclohexanone < CH<sub>3</sub>CHO < H<sub>2</sub>CO
- H<sub>2</sub>CO < cyclohexanone < CH<sub>3</sub>CHO < 2-methylcyclohexanone
- 2-methylcyclohexanone < cyclohexanone < CH<sub>3</sub>CHO < H<sub>2</sub>CO
- cyclohexanone < 2-methylcyclohexanone < H<sub>2</sub>CO < CH<sub>3</sub>CHO

Answer: <https://biology-forums.com/index.php?topic=1898680>

### Question 1898

Given that 1,3-butadiene has a uv absorption of 217nm, predict the approximate absorption for the conjugated system in vitamin D<sub>3</sub>.

- 185nm
- 270nm
- 240nm
- 250nm

Answer: <https://biology-forums.com/index.php?topic=1899703>

### Question 1899

Under what conditions is the methyl glycoside of galactose prepared?

Answer: <https://biology-forums.com/index.php?topic=1899907>

### Question 1900

Draw the Fischer projection of (2R,4R)-2,4-dibromopentane.

Answer: <https://biology-forums.com/index.php?topic=1897693>

### Question 1901

Provide the name of the major organic product that results when (R)-2-butyl tosylate is treated with sodium iodide.

Answer: <https://biology-forums.com/index.php?topic=1898454>

### Question 1902

Which of the standard amino acids is achiral?

- alanine
- lysine

- valine
- proline
- glycine

Answer: <https://biology-forums.com/index.php?topic=1899962>

### Question 1903

Provide the structure of the semicarbazone derivative of 3-pentanone.

Answer: <https://biology-forums.com/index.php?topic=1898709>

### Question 1904

Name the following compound and use the appropriate cis/trans designation.

Answer: <https://biology-forums.com/index.php?topic=1897389>

### Question 1905

The industrial method of making alkenes is via catalytic cracking. If decane is subjected to these conditions, hexane and 1-butene are one set of possible products. Draw the products in line-angle structures.

Answer: <https://biology-forums.com/index.php?topic=1897961>

### Question 1906

Shown below is one of the sex pheromones from the butterfly family. How many sp<sup>2</sup> hybridized carbon atoms are present in this molecule?

- 1
- 2
- 3
- 4
- 5

Answer: <https://biology-forums.com/index.php?topic=1897249>

### Question 1907

The solid-phase method of peptide synthesis was devised by \_\_\_\_\_.

- Edman
- Merrifield
- Strecker
- Sanger
- Lister

Answer: <https://biology-forums.com/index.php?topic=1900072>

### Question 1908

Which solvent is not suitable when running a reaction with a Grignard or organolithium reagent?

- Methanol
- Tetrahydrofuran
- DMSO
- Diethyl ether

Answer: <https://biology-forums.com/index.php?topic=1898359>

### Question 1909

Provide the necessary synthetic sequence for preparing 1,3-cyclopentadiene from cyclopentane.

Answer: <https://biology-forums.com/index.php?topic=1899631>

### Question 1910

Draw the structure of cis-1,3-dichlorocyclopentane.

Answer: <https://biology-forums.com/index.php?topic=1897753>

### Question 1911

The following splitting pattern represents one of the vinyl protons of styrene. Identify which proton is represented and list all the coupling constants (J values) for the splitting pattern.

Answer: <https://biology-forums.com/index.php?topic=1899347>

### Question 1912

Provide the name of the major organic product that results when trans-4-methylcyclohexanol is treated with Lucas reagent.

Answer: <https://biology-forums.com/index.php?topic=1898435>

### Question 1913

An acid which could not be prepared by the reaction of an organic halide with cyanide ion followed by acid hydrolysis of the nitrile is \_\_\_\_\_.

- propanoic acid
- (CH<sub>3</sub>)<sub>3</sub>CCO<sub>2</sub>H
- phenylacetic acid
- CH<sub>3</sub>(CH<sub>2</sub>)<sub>14</sub>CO<sub>2</sub>H
- acetic acid

Answer: <https://biology-forums.com/index.php?topic=1898905>

### Question 1914

Which alcohol reacts most rapidly with the Lucas reagent?

- benzyl alcohol
- isobutanol
- 2-propanol
- methanol

Answer: <https://biology-forums.com/index.php?topic=1898425>

### Question 1915

With which of the following reagents would linoleic acid not react?

- O<sub>3</sub>
- Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>
- HBr
- Br<sub>2</sub>
- warm, concentrated KMnO<sub>4</sub>

Answer: <https://biology-forums.com/index.php?topic=1900136>

### Question 1916

When cyclohexene is subjected to mercuriation in methanol and the resulting mixture is reduced with sodium borohydride, the major organic product is \_\_\_\_\_.

- a meso diol
- a meso ether
- a 1:1 mixture of enantiomeric diols
- a 1:1 mixture of enantiomeric ethers
- methoxycyclohexane

Answer: <https://biology-forums.com/index.php?topic=1899523>