

Question 1

Two boxes are connected to each other by a string as shown in the figure. The 10-N box slides without friction on the horizontal table surface. The pulley is ideal and the string has negligible mass. What is true about the tension T in the string?

- $T > 30 \text{ N}$
- $T = 30 \text{ N}$
- $T = 10 \text{ N}$
- $T < 30 \text{ N}$
- $T = 20 \text{ N}$

Answer: <https://biology-forums.com/index.php?topic=1896096>

Question 2

Consider a very small hole in the bottom of a tank that is in diameter and filled with water to a height of Find the speed at which the water exits the tank through the hole.

- 17.64 m/s
- 48.3 m/s
- 4.20 m/s
- 44.1 m/s

Answer: <https://biology-forums.com/index.php?topic=1895993>

Question 3

Two stereo speakers mounted 4.52 m apart on a wall emit identical sound waves. You are standing at the opposite wall of the room at a point directly between the two speakers. You walk 2.11 m parallel to the wall, to a location where you first notice that the sound intensity is essentially zero. If the wall along which you are walking is from the wall with the speakers, what is the wavelength of the sound waves? The walls are cushioned to absorb sound reflections.

- 2.05 m
- 1.71 m
- 2.57 m
- 2.91 m

Answer: <https://biology-forums.com/index.php?topic=1895637>

Question 4

In outer space, a positive charge q is released near a positive fixed charge Q , as shown in the figure. As q moves away from Q , what is true about the motion of q ? (There may be more than one correct choice.)

- It will move with decreasing acceleration.
- It will move with decreasing speed.
- It will move with constant acceleration.
- It will move with increasing speed.
- It will move with increasing acceleration.

Answer: <https://biology-forums.com/index.php?topic=1895669>

Question 5

Today, uranium contains (half-life = 0.70 billion years) and (half-life = 4.5 billion years). At a time 1.9 billion years ago, what was the fraction of in uranium?

- 4.90%
- 4.72%
- 3.53%
- 6.76%

Answer: <https://biology-forums.com/index.php?topic=1895289>

Question 6

The figure shows a graph of the position x as a function of time t for a system undergoing simple harmonic motion. Which one of the following graphs represents the acceleration of this system as a function of time?

- graph a
- graph b
- graph c
- graph d

Answer: <https://biology-forums.com/index.php?topic=1896003>

Question 7

The L-shaped object shown in the figure consists of three small masses connected by thin uniform rods, each rod of mass 3.00 kg. Assume that the masses shown are accurate to three significant figures. What is the moment of inertia of this object (a) about the x-axis, and (b) about the y-axis?

Answer: <https://biology-forums.com/index.php?topic=1896153>

Question 8

An electron is moving to the right, as shown in the figure. Suddenly it encounters uniform magnetic field pointing out of the page. Which one of the three paths shown will it follow in the field?

- path a
- path b
- path c

Answer: <https://biology-forums.com/index.php?topic=1895451>

Question 9

An uncharged capacitor is connected in series with a resistor, a dc battery, and an open switch. At time $t = 0$ s, the switch is closed. Which of the graphs below best describes the potential difference V across the resistor as a function of time t ?

Answer: <https://biology-forums.com/index.php?topic=1895366>

Question 10

A tank holds a layer of oil, of thickness $T_o = 1.43$ m, that floats on a layer of syrup of thickness $T_s = 0.640$ m, as shown in the figure. Both liquids are clear and do not mix together. A light ray, originating at the bottom of the tank at point P, crosses the oil-syrup interface at a point 0.900 m from the axis. The ray continues and arrives at the oil-air interface, 2.00 m to the right of P and at the critical angle. What is the index of refraction of the oil?

- 1.62
- 1.66
- 1.68
- 1.60
- 1.64

Answer: <https://biology-forums.com/index.php?topic=1895661>

Question 11

A sinusoidal electromagnetic wave has a peak electric field of What is the intensity of the wave?

- 21 kW/m²
- 11 kW/m²
- 170 kW/m²
- 85 kW/m²

Answer: <https://biology-forums.com/index.php?topic=1895563>

Question 12

An electron is initially moving to the right when it enters a uniform electric field directed upwards, as shown in the figure. Which trajectory (X, Y, Z, or W) will the electron follow in the field?

- trajectory W
- trajectory X
- trajectory Y
- trajectory Z

Answer: <https://biology-forums.com/index.php?topic=1895680>

Question 13

A ring with a clockwise current (as viewed from above the ring) is situated with its center directly above another ring, which has a counter-clockwise current, as shown in the figure. In what direction is the net magnetic force exerted on the top ring due to the bottom ring?

- to the left
- downward
- to the right
- upward
- The net force is zero.

Answer: <https://biology-forums.com/index.php?topic=1895462>

Question 14

Three equal charges $+Q$ are at three of the corners of a square of side d . A fourth charge $+Q$ of equal magnitude is at the center of the square as shown in the figure Which one of the arrows shown represents the net force acting on the charge at the center of the square?

- A
- B
- C
- D

Answer: <https://biology-forums.com/index.php?topic=1895673>

Question 15

An ideal 10.0-V dc is connected across a resistor in series with an resistor. What is the potential drop across the resistor?

- 14 V
- 5.9 V
- 7.0 V
- 4.1 V

Answer: <https://biology-forums.com/index.php?topic=1895420>

Question 16

The intensity of the waves from a point source at a distance d from the source is I . What is the intensity at a distance $2d$ from the source?

- $I/4$
- $4I$
- $I/2$
- $2I$
- I

Answer: <https://biology-forums.com/index.php?topic=1895614>