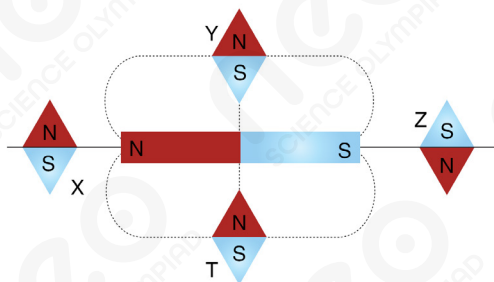


01

Which part of an electric cell is the positive terminal?

- A) The flat end
- B) The coiled wire
- C) The metal cap
- D) The plastic cover

02



A portion of the magnetic field lines of a bar magnet is drawn, and compass needles X, Y, Z, and T, which can rotate freely about their centers, are placed at the indicated positions.

Which of X, Y, Z and T will rotate clockwise when released?

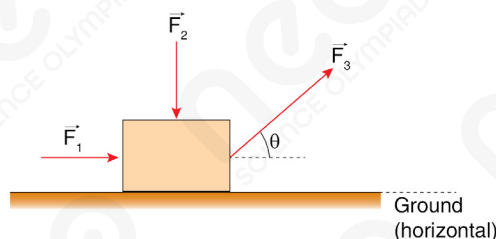
- A) X and Z
- B) X, Y and T
- C) Y, Z and T
- D) Y

03

A pendulum is released from a height of 2 m. Neglecting air resistance, which statement best describes the energy transformations at the lowest point?

- A) All gravitational potential energy is converted into kinetic energy
- B) Kinetic energy is maximum and gravitational potential energy is minimum
- C) Both kinetic and gravitational potential energy are zero
- D) Total energy is doubled compared to the starting point

04



On a rough horizontal surface, forces $\vec{F}_1$, $\vec{F}_2$ and $\vec{F}_3$ are applied simultaneously to an object, causing it to accelerate at "a".

Which forces, if increased in magnitude, will increase the acceleration "a" of the object?

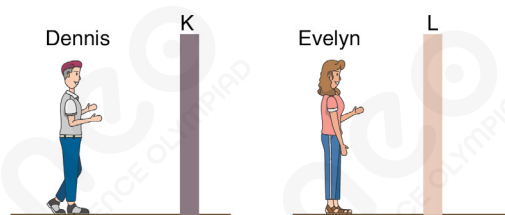
- A) $\vec{F}_1$
- B) $\vec{F}_2$
- C) $\vec{F}_3$
- D) $\vec{F}_1$ and $\vec{F}_3$

05

An impulse of 10 N-s is applied to an object. If the force lasted for 2 seconds, what was the average force applied?

- A) 2 N
- B) 5 N
- C) 10 N
- D) 20 N

06

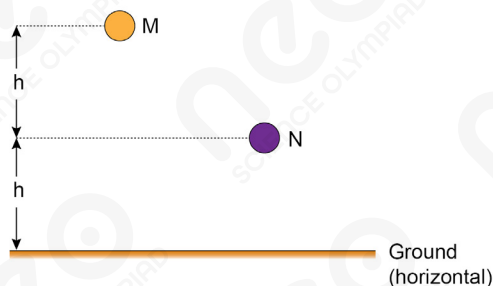


In the figure, mirrors are placed in boxes K and L. Dennis is looking at his reflection in the mirror in K, and Evelyn is looking at her reflection in the mirror in L.

If Dennis sees his reflection smaller and upright, and Evelyn sees her reflection larger and upright, what can be said about the types of mirrors in K and L?

- A) Mirror in K: Plane, Mirror in L: Plane
- B) Mirror in K: Plane, Mirror in L: Concave
- C) Mirror in K: Convex, Mirror in L: Concave
- D) Mirror in K: Convex, Mirror in L: Plane

07



In an environment where air resistance is negligible, the M and N objects are held stationary at the positions shown. The potential energies of the objects relative to the ground are equal.

When released from their respective positions, the objects M and N, with weights G_M and G_N , strike the ground with kinetic energies E_M and E_N , respectively.

Which of the following correctly represents the relationship between G_M , G_N and E_M , E_N ?

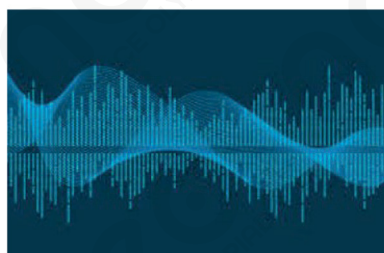
- A) $G_M = 2 \cdot G_N$ and $E_M = E_N$
- B) $G_M = G_N$ and $E_M = E_N$
- C) $2 \cdot G_M = G_N$ and $E_M = 2 \cdot E_N$
- D) $2 \cdot G_M = G_N$ and $E_M = E_N$

08

What is the main focus of environmental science?

- A) The study of outer space
- B) Interactions between humans and the environment
- C) The study of chemical reactions
- D) The production of electricity

09



Which of the following statements about sound waves is incorrect?

- A) Sound waves propagate fastest in solids.
- B) Sound waves create regions of high and low pressure in a material medium.
- C) Sound waves are longitudinal waves relative to the direction of vibration.
- D) Sound becomes higher-pitched as its frequency decreases.

10

What is radioactivity?

- A) The process of atoms gaining energy
- B) The emission of particles or energy from unstable atomic nuclei
- C) The splitting of atoms by chemical reactions
- D) The process of atoms gaining mass

11



You place a metal spoon in a hot cup of tea. After a minute, the spoon feels warm. What type of thermal energy transfer between the tea and the spoon has occurred?

- A) Electrical
- B) Sound
- C) Conduction
- D) Radiation

12

Which of these methods of heat transfer is the most obscure (least noticeable) form that everyone experiences every day?

A)



Convection

B)



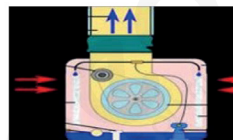
Conduction

C)



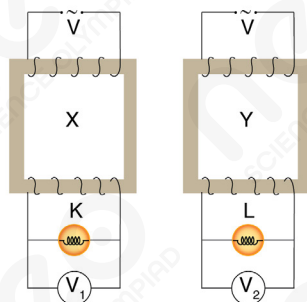
Radiation

D)



Convection in gases

13



In the figure, ideal transformers X and Y are connected to alternating currents with the same effective voltage applied to their inputs.

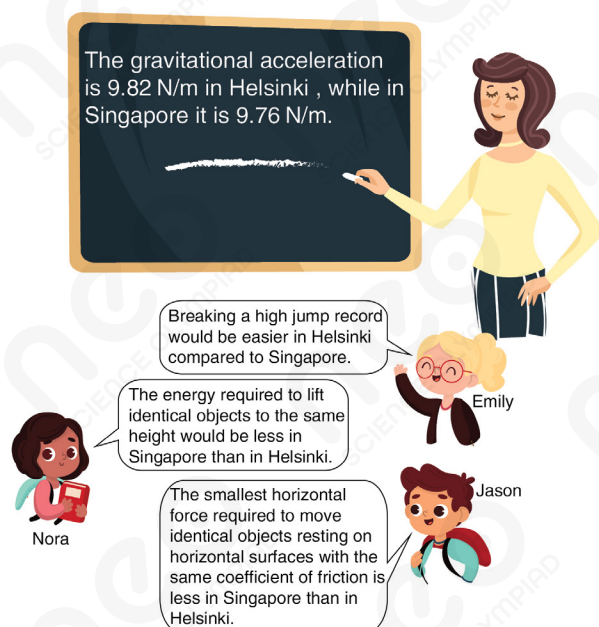
Identical bulbs K and L are connected, and the voltmeters across their terminals display readings V_1 and V_2 , respectively.

Given that $V_1 > V > V_2$, which of the following statements are correct?

- I. Transformer X is a step-up transformer.
- II. Transformer Y is a step-up transformer.
- III. The brightness of bulb K is greater than that of bulb L.

- A) I B) II C) III D) I and III

14



The teacher writes something on the board and then asks her students what kind of physical effects this difference could have.

Some of the students' answers are as above.

Based on this, which students' statements are correct?

- A) Emily
- B) Emily and Nora
- C) Emily and Jason
- D) Nora and Jason

15

Zoe fills two identical balloons with the same type of gas in equal masses. After sealing the balloons, she places one in a hot environment and the other in a cold environment.

When thermal equilibrium is reached, which of the following properties of the gas inside the balloons will differ?

I. Internal energy

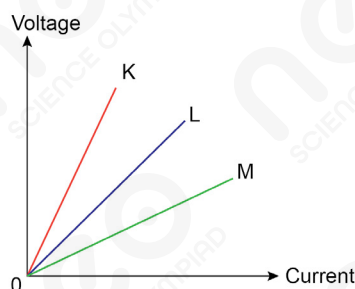
II. Density

III. Volume

(The pressure in the environments where the balloons are placed is the same, and the balloons do not burst.)

- A) I and II
- B) II and III
- C) I and III
- D) I, II, and III

16



The conductive wires K, L, and M are made of the same material. The cross-sectional areas of K and L, and the lengths of L and M are equal.

Based on the voltage-current ($V - I$) graphs for K, L and M, what is the relationship between the lengths l_K and l_L of K and L, and the cross-sectional areas S_L and S_M of L and M?

- A) $l_K = l_L$ and $S_L = S_M$
- B) $l_K > l_L$ and $S_L < S_M$
- C) $l_K > l_L$ and $S_L > S_M$
- D) $l_K < l_L$ and $S_L < S_M$

17

Which interaction highlights the connection between the hydrosphere and the geosphere during a natural disaster?

- A) Volcanic eruptions creating new islands
- B) Floodwaters eroding riverbanks
- C) Plants growing in fertile soil after a flood
- D) Hurricanes forming in warm ocean waters

18

A rock is thrown vertically upward and reaches a maximum height of 45 m. What was its initial velocity? ($g = 10 \text{ m/s}^2$)

- A) 20 m/s
- B) 25 m/s
- C) 30 m/s
- D) 35 m/s

19

A person pushes a box with a force of 50 N at an angle of 60° to the horizontal over a distance of 10 m.

How much work is done? ($\cos 60^\circ = 0.5$)

- A) 250 J
- B) 350 J
- C) 430 J
- D) 500 J

20

What is the energy released in a nuclear reaction primarily due to?

- A) The chemical bonds in atoms
- B) The conversion of mass into energy as described by $E=mc^2$
- C) The splitting of electrons
- D) The movement of atoms

21



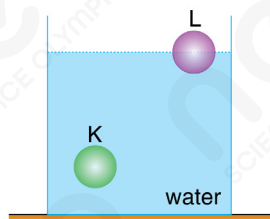
Kelsy rubs a blown-up plastic balloon on her hair and then touches the rubbed side of the balloon to a wall, causing the balloon to stick to the wall.

Which of the following statements are correct?

- I. The balloon is charged with negative (-) charges.
- II. The wall is charged with positive (+) charges.
- III. An electric force forms between the balloon and the wall.

- A) I and II
- B) II and III
- C) I and III
- D) III

22



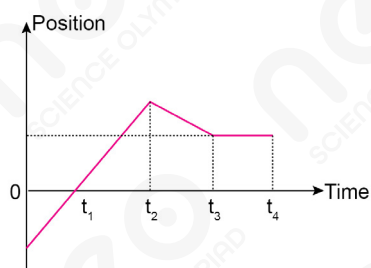
When objects K and L are placed in water, their equilibrium positions are shown as in the diagram. A certain amount of salt is then added to the water and mixed.

Accordingly, once the new equilibrium position is reached, which of the following statements are incorrect?

- I. Object K sinks.
- II. Object L remains suspended.
- III. The magnitude of the buoyant force acting on K does not change.
- IV. The magnitude of the buoyant force acting on L does not change.

- A) I
- B) II
- C) III
- D) II and IV

23



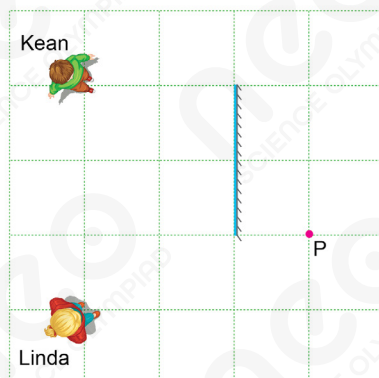
The position-time graph of a vehicle moving along a straight path is shown in the figure.

Which of the following statements are correct?

- I. The vehicle changed its direction of motion at t_1 .
- II. The vehicle is moving at a constant speed during the time interval $(t_3 - t_4)$.
- III. The vehicle moves in different directions during the time intervals $(t_1 - t_2)$ and $(t_2 - t_3)$.

- A) I
- B) II
- C) III
- D) II and III

24



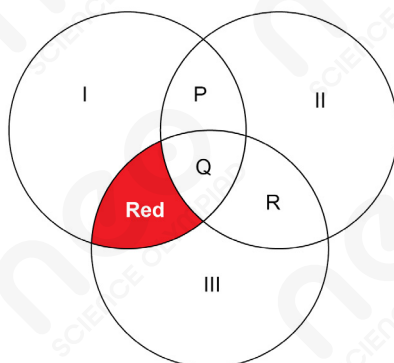
Kean and Linda place a plane mirror and a small ball perpendicular to a grid of equal square divisions. The ball is not drawn in the figure, but Kean, standing at the indicated position, sees the ball's image at point P in the mirror.

Which of the following statements is/are correct?

- I. Linda is closer to the ball than Kean.
- II. Linda cannot see the ball's image.
- III. Linda sees the ball's image at a location different from P.

- A) I
- B) II
- C) III
- D) I and II

25



Eve has painted the circular regions I, II, and III with three different primary colours. Using combinations of these primary colours, she has obtained the colours P, Q, R and red.

Which of the following could correctly identify the colours of P, Q and R?

- A) P: Green, Q: Black, R: Blue
- B) P: Green, Q: White, R: Blue
- C) P: Cyan, Q: Black, R: Blue
- D) P: Blue, Q: Black, R: Yellow

Answer Key

1	C
2	C
3	B
4	D
5	B
6	C
7	D
8	B
9	D
10	B
11	C
12	D
13	D
14	D
15	D
16	B
17	B
18	C
19	A
20	B
21	C
22	A
23	D
24	D
25	A