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Taxila Central College – Horana

අධ්‍යයන පොදු සහතික පත්‍ර (උසස්පෙළ), 13 ශ්‍රේණිය, තෙවනවාර් පරීක්ෂණය, 2026 ජූලි
General Certificate of Education (Adv. Level) Examination, Grade 13, Third Term Test, July 2026

භෞතික විද්‍යාව

I

Physics

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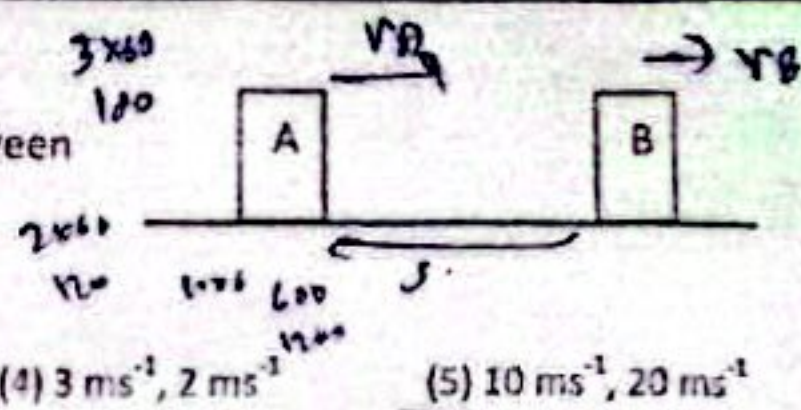
පැය දෙකයි

Two hours

- Which of the following is a physical quantity with no units and dimensions?
 (1) Relative velocity (2) Sound intensity level (3) Effective dose of radiation
 (4) Relative humidity (5) Electromotive force
- The unified atomic mass unit is:
 (1) The mass of an electron. (2) The mass of a neutron. (3) $1/12$ of the mass of a C-12 atom.
 (4) The mass of an up quark. (5) The mass of a down quark.
- An object is projected vertically upwards. When the object reaches its maximum height:
 A. Velocity becomes zero. ✓
 B. Force becomes zero.
 C. Acceleration becomes zero.
 The correct statement(s) is/are:
 (1) A only (2) B only (3) A and B only
 (4) B and C only (5) All A, B, and C are true.
- The magnitude of the current flowing through a photocell depends on:
 (1) Frequency of the incident radiation
 (2) Intensity of the incident radiation
 (3) Threshold frequency of the metal
 (4) Work function of the metal
 (5) Type of metal
- If the mass of the Earth is M and its radius is R , the escape velocity of an object on the surface of the Earth is:
 (1) $\frac{GM}{R}$ (2) $\frac{2GM}{R}$ (3) $\frac{GM}{2R}$ (4) $\sqrt{\frac{GM}{R}}$ (5) $\sqrt{\frac{2GM}{R}}$
- The length of a simple pendulum with a time period of 2 seconds is: (Take $\pi^2 = 10$)
 (1) 25 cm (2) 50 cm (3) 60 cm (4) 1 m (5) 2 m
- The excess pressure inside a soap bubble is ΔP . If the surface tension of the soap is T , the radius of the bubble is:
 (1) $2T / \Delta P$ (2) $4T / \Delta P$ (3) $\Delta P / 2T$ (4) $\Delta P / 4T$ (5) $\Delta P / 8T$

8. The two objects A and B shown in the figure are moving in the rightward direction with uniform velocities. If the distance between A and B increases by 300 m within a time of one minute, the velocities of A and B could respectively be:

- (1) 5 ms^{-1} , 10 ms^{-1} (2) 10 ms^{-1} , 5 ms^{-1} (3) 2 ms^{-1} , 3 ms^{-1} (4) 3 ms^{-1} , 2 ms^{-1} (5) 10 ms^{-1} , 20 ms^{-1}



9. During β^- decay:

- (1) The atomic number decreases by 1. $\times$
 (2) The mass number decreases by 2. $\times$
 (3) A proton inside the nucleus converts into a neutron. $\times$
 (4) A down quark inside the nucleus converts into an up quark.
 (5) An electron neutrino is also emitted.

$$S = v_A \times 60$$

$$S + 300 = v_B \times 60$$

$$\frac{210}{5} =$$

10. An object is in equilibrium under 10 coplanar forces. Two of these forces are equal in magnitude, opposite in direction, and collinear.

Consider the following statements:

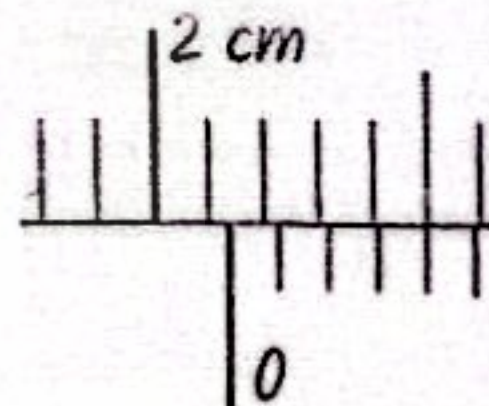
- A. The resultant of the remaining 8 forces is zero. $\checkmark$
 B. The resultant moment produced by the remaining 8 forces about any point is zero. $\times$
 C. The lines of action of the remaining 8 forces intersect at the same point.

the true statement(s) is/are:

- (1) A only (2) B only (3) A and B only (4) B and C only (5) All A, B, and C are true.

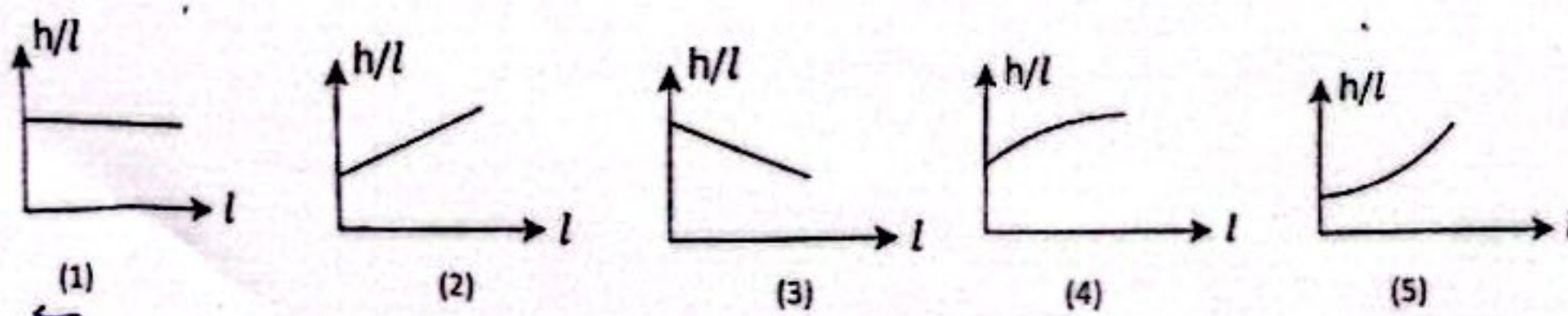
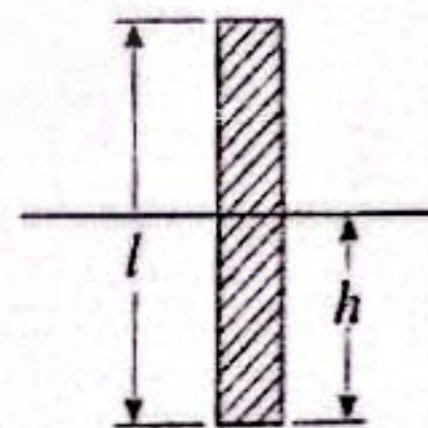
11. The reading of the vernier caliper shown in the figure is 2.11 cm. The total number of divisions on the vernier scale is:

- (1) 10 (2) 20 (3) 40 (4) 50 (5) 100

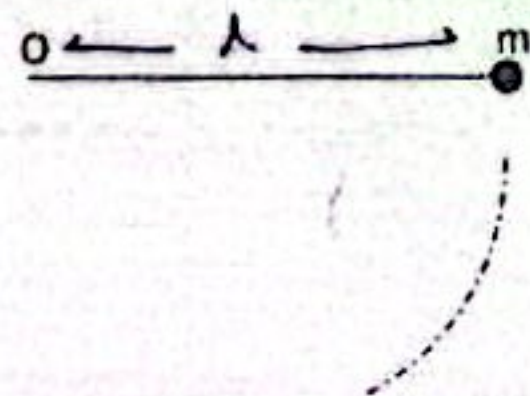


12. As shown in the figure, a uniform rod of a certain length l floats vertically submerged in water up to a certain height h . A student makes several rods of different lengths from the same material, makes them float vertically in water, and plots a graph of the submerged fraction (h/l) versus the length of the rod (l).

The graph that best represents this is:



13. As shown in the figure, one end of a string of length of l is attached to point O, and a mass m is attached to the other end. The string is released from a horizontal position. When the string reaches the vertical position, the linear velocity of the particle is,



- (1) $\sqrt{\frac{gl}{2}}$ (2) $\sqrt{gl}$ (3) $\sqrt{2gl}$
 (4) $\sqrt{\frac{2g}{l}}$ (5) $\sqrt{\frac{g}{2l}}$

14. If the sound intensity level at a certain place is doubled, it becomes equal to the threshold of pain intensity level. The sound intensity at that place is (W m^{-2})

- (1) 1×10^{-12} (2) 1×10^{-6} (3) 1×10^{-4} (4) 1×10^{-2} (5) 1

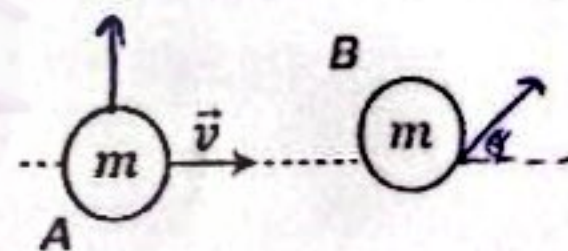
15. The length of an astronomical telescope in normal adjustment is 44 cm. Its angular magnification is 10. The focal length of the eyepiece is:

- (1) 4 cm (2) 4.4 cm (3) 40 cm (4) 88 cm (5) 440 cm

16. The back electromotive force of a motor is zero when:

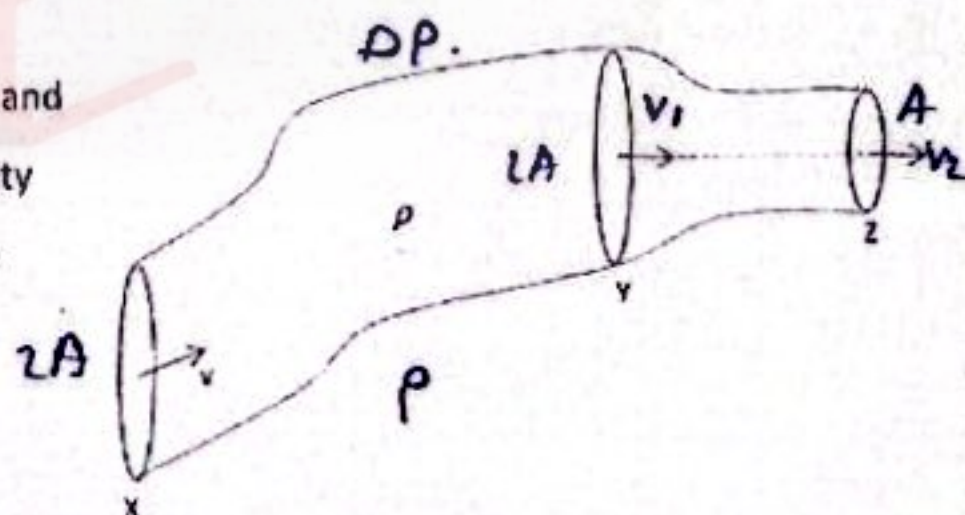
- (1) It starts operating.
 (2) It rotates with maximum speed. $\times$
 (3) A minimum current flows through the motor.
 (4) The efficiency of the motor is at its maximum.
 (5) The speed of the motor is decreasing.

17. As shown in the figure, an object of a given mass moving with a velocity collides with a stationary object. If after the collision the first object moves with a velocity perpendicular to its initial direction of motion, the angle the second object's direction of motion makes with the initial direction is:

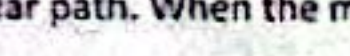


- (1) $\sin^{-1}(\frac{1}{2})$ (2) $\tan^{-1}(\frac{1}{2})$ (3) $\sin^{-1}(\frac{1}{4})$ (4) $\cos^{-1}(\frac{1}{4})$ (5) $\tan^{-1}(\frac{1}{4})$

18. As shown in the figure, a fluid flows smoothly and continuously. The cross-sectional radii at X and Y are equal, and the cross-sectional radius at Z is half of that. The fluid velocity at X is given, and the density of the fluid is ρ . If the pressure difference between X and Y is ΔP , the pressure difference between X and Z is:



- (1) $\frac{3}{2}\rho v^2$ (2) $\Delta P + \frac{1}{2}\rho v^2$ (3) $\Delta P - \frac{1}{2}\rho v^2$
 (4) $\Delta P + \frac{3}{2}\rho v^2$ (5) $\Delta P - \frac{3}{2}\rho v^2$

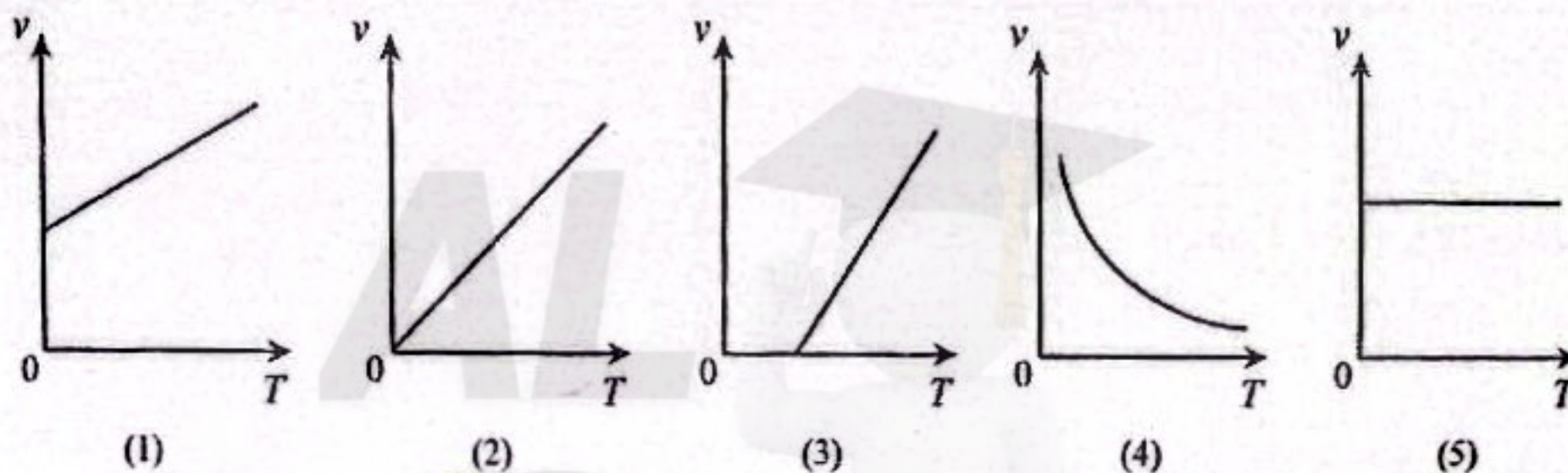
19. As shown in the figure, a mass attached to the end of a string moves in a horizontal circular path. When the mass is moved in the horizontal circular path with increasing angular velocity:
- A. The horizontal component of the tension increases. ✓
- B. The vertical component of the tension remains unchanged.
- C. The tangential speed of the mass increases. ✓
- 
- A diagram showing a horizontal circular path. A vertical line represents a support or axis. A string is attached to the support and extends downwards at an angle. At the end of the string is a mass. The mass is moving in a horizontal circular path, indicated by a dashed circle around the vertical axis. The string, the vertical axis, and the circular path are all in the same plane.



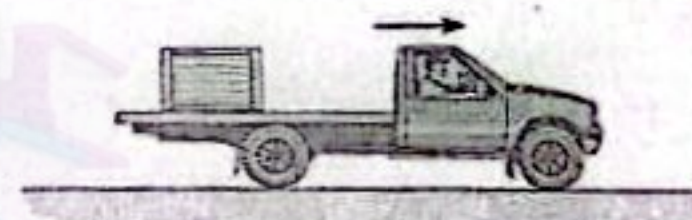
The true statement(s) is/are:

- (1) A only (2) B only (3) C only (4) A and C only (5) All A, B, and C are true.

20. For a constant mass of gas at constant pressure, the variation of volume (V) with absolute temperature (T) is represented by:



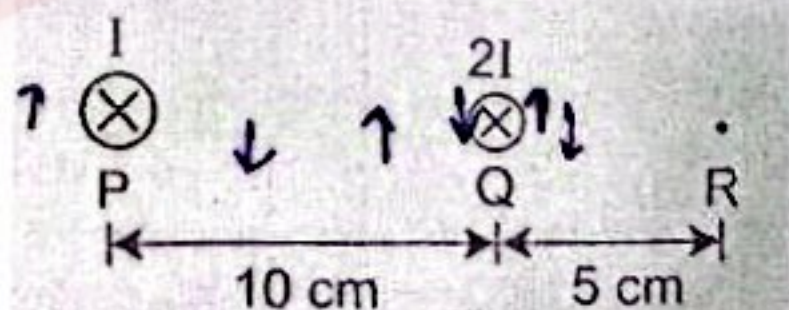
21.) A box is placed on the bed of a lorry moving along a horizontal road as shown in the figure. The coefficient of static friction between the box and the lorry bed is 0.4. The maximum acceleration the lorry can move with so that the box does not slide on the lorry bed is:



- (1) 2 ms^{-2} (2) 4 ms^{-2} (3) 5 ms^{-2} (4) 8 ms^{-2} (5) 10 ms^{-2}

22. As shown in the figure, two infinitely long conductors carrying currents I and $2I$ into the plane are placed at a distance. For the resultant magnetic force acting on the Q to be zero, the magnitude and direction of the current in a conductor placed at a certain position R must be:

- (1) $1/2$, Into the plane
- (2) $1/2$, Out of the plane
- (3) 1 , Out of the plane
- (4) $2l$, Into the plane
- (5) $2l$, Out of the plane



$$f_2 = \frac{5 \times 730}{24}$$

$$\frac{16}{18}$$

$$f = \frac{p \times v}{2d} \quad f = \frac{p \times 390}{2 \times 4}$$

$$\frac{F(9+1)370}{1276}$$

23. A tuning fork resonates with two consecutive resonance lengths 46 cm and 76 cm of a pipe closed at one end. If the speed of sound in air is 330 ms^{-1} , the frequency of the tuning fork is:

- (1) 275 Hz (2) 550 Hz (3) 733 Hz (4) 825 Hz (5) 1100 Hz

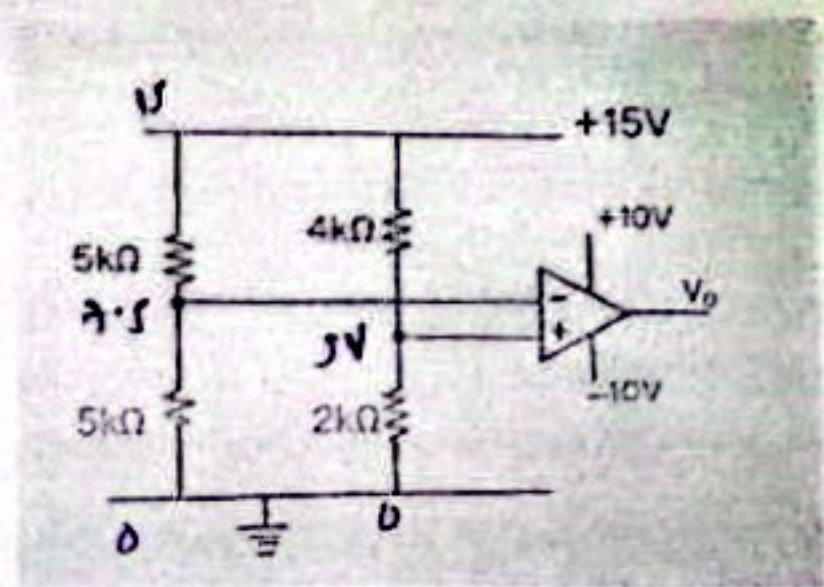
$76 \overline{) 1450}$ $25 \cdot \frac{30330}{990}$
 $\underline{276}$ $\underline{990}$
 250 152

$$\frac{p}{44} = \frac{p+12}{76}$$

$26P = 46P + 1$
 $30P = 1$
 $P =$

24. In the circuit shown in the figure, the value of the, V_o is:

- (1) -2.5 V
 (2) 2.5 V
 (3) 7.5 V
(4) -10 V
 (5) 10 V

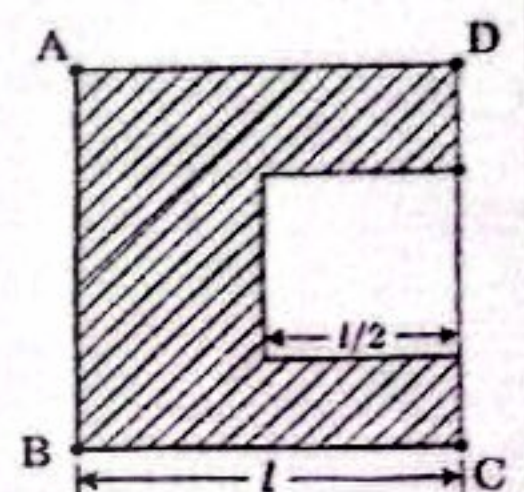


25. A 16 cm long pipe closed at one end resonates in its fundamental tone with a vibrating tuning fork. A 12 cm long stretched string resonates in its fundamental tone with the same tuning fork. The ratio of the speed of sound in air to the speed of transverse waves in the string is,

- (1) $\frac{1}{3}$ (2) $\frac{2}{3}$ (3) $\frac{3}{4}$ (4) $\frac{4}{3}$ (5) $\frac{8}{3}$

26. A square section of side length $l/2$ is removed from a uniform square lamina of side length l . The perpendicular distance from the axis AB to the new center of gravity of the lamina is:

- (1) $\frac{l}{4}$ (2) $\frac{3l}{8}$ (3) $\frac{5l}{12}$
 (4) $\frac{7l}{16}$ (5) $\frac{3l}{4}$

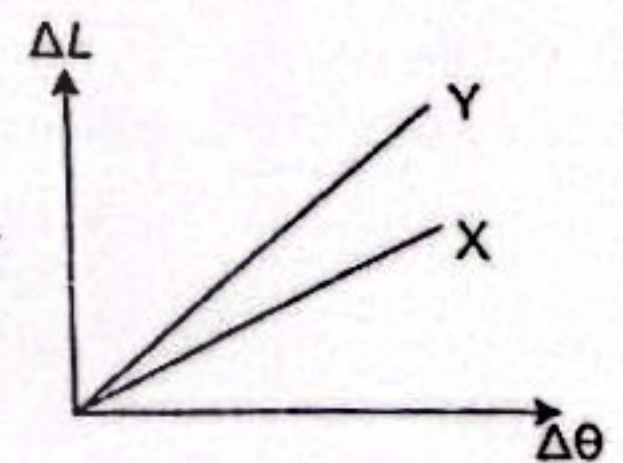


27. A person suffering from short-sightedness wears a lens of power -0.5D .

The distance to his naked eye's far point is:

- (1) 50 cm (2) 100 cm (3) 200 cm (4) 500 cm (5) 750 cm

28. The graph shows the variation of linear expansion (Δl) with the increase in temperature ($\Delta\theta$) for two rods X and Y.



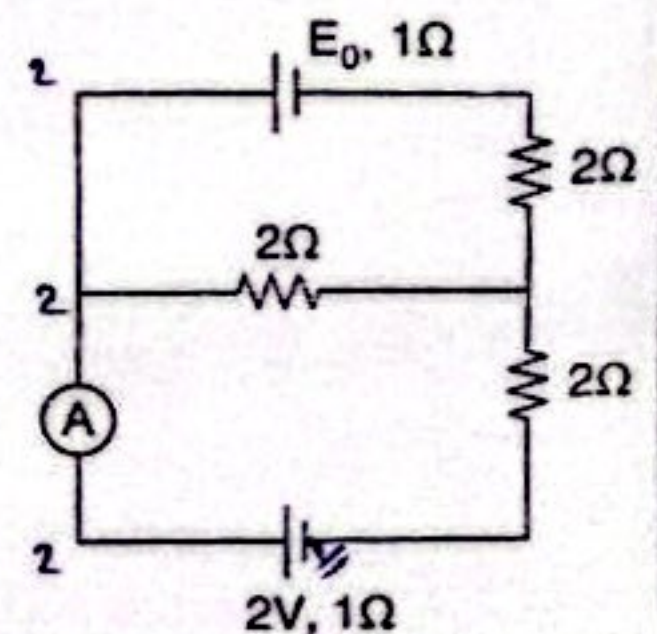
- A. If the lengths are equal, the linear expansivity of the Y is greater than the X. ✓
 B. If the length of the X is greater than Y, its linear expansivity is less than Y. ✓
 C. If the length of the X is less than Y, its linear expansivity is greater than Y.

The statement(s) that is/are always true is/are:

- (1) A only (2) B only (3) C only
(4) A and B only (5) All A, B, and C are true.

29. If the ammeter reading in the circuit shown in the figure is zero, the value of the E_0 is:

- (1) 2 V (2) 3 V (3) 4 V
 (4) 5 V (5) 6 V

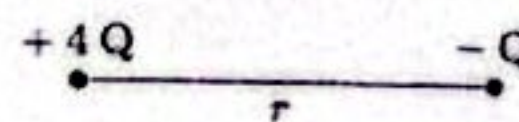


30. An object projected from the bottom of an inclined plane has a velocity of $4v$. Velocity of the object is $3v$ when it has traveled a distance x along the plane.

The maximum distance the object travels along the inclined plane before coming to rest is:

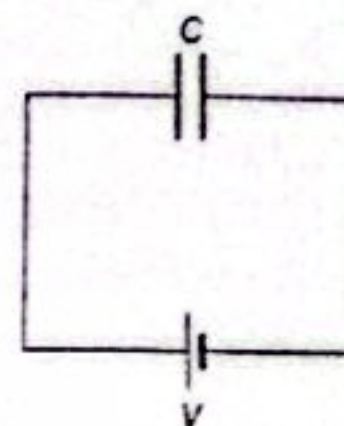
- (1) $\frac{12x}{5}$ (2) $\frac{16x}{7}$ (3) $3x$ (4) $4x$ (5) $9x$

31. As shown in the figure, two charges $4Q$ and $-Q$ are placed at a distance r . The distance from the charge $-Q$ to the neutral point caused by the charges is :



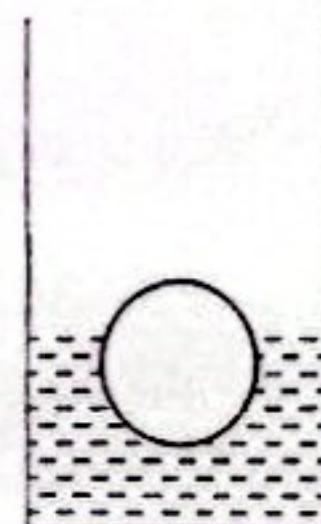
- (1) $\frac{r}{4}$ (2) $\frac{r}{2}$ (3) $\frac{3r}{4}$ (4) r (5) $2r$

32. As shown in the figure, a potential difference V is given to a capacitor capacitance of C . When the potential supply is removed and the distance between the capacitor plates is doubled, the energy stored in the capacitor is



- (1) $\frac{1}{4}cv^2$ (2) $\frac{1}{2}cv^2$ (3) cv^2
(4) $2cv^2$ (5) $8cv^2$

33. As shown in the figure, an object floats with a $\frac{4}{5}$ of the volume of its submerged in water. When coconut oil is poured until the beaker is filled, a $\frac{1}{5}$ of the volume of the object remains in the water. The density of coconut oil is (density of water is 1000 kg m^{-3})



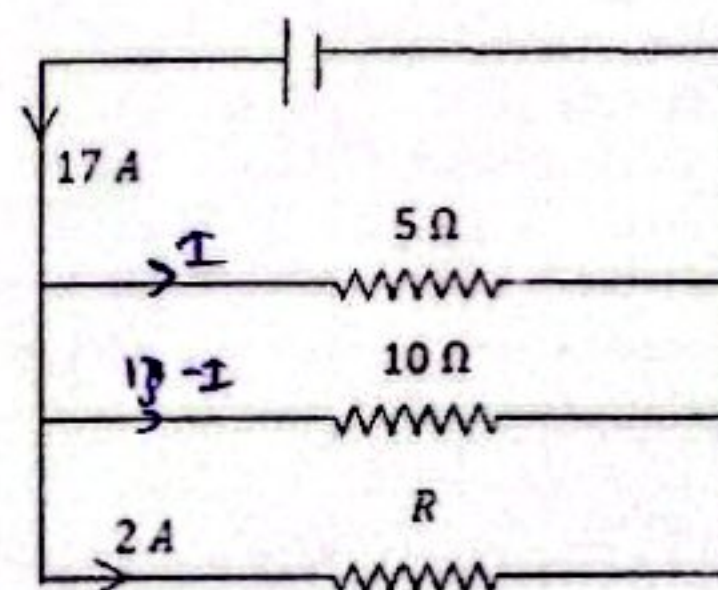
- (1) 600 kg m^{-3} (2) 700 kg m^{-3} (3) 750 kg m^{-3}
(4) 800 kg m^{-3} (5) 850 kg m^{-3}

34. On a day when the room temperature is at a 25°C , it takes a 12 minutes for a hot object's temperature to decrease 60°C to 50°C . On a day with a θ room temperature, that time changes to 18 minutes. The value of θ is,

- (1) 10°C (2) 15°C (3) 20°C (4) 30°C (5) 35°C

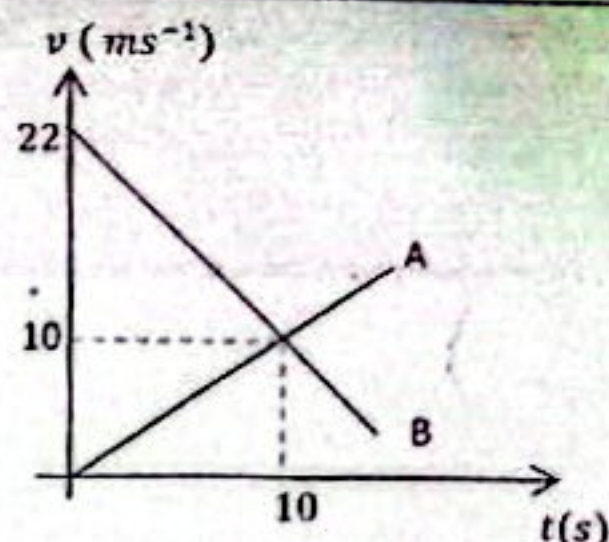
35. The value of the resistance R is,

- (1) 2Ω (2) 15Ω (3) 25Ω
(4) 50Ω (5) 122Ω



36. The velocity-time graphs for two objects A and B are shown in the figure. If A pass B at $t=10s$, the distance between A and B at $t=5s$ is,

- (1) 12.5 m (2) 27.5 m (3) 102.5 m
(4) 110 m (5) 210 m

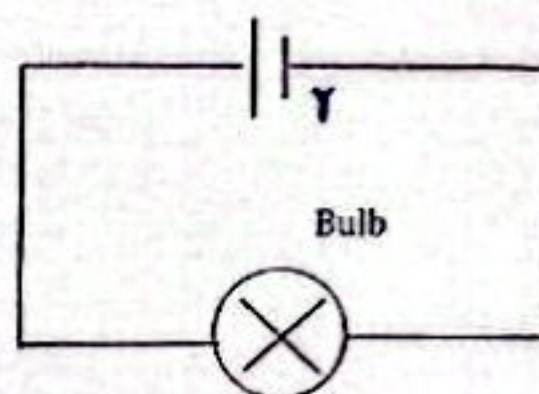


37. A bulb is connected to a cell with internal resistance as shown in the figure. When another identical cell is connected in series with the cell:

- A. The current through the bulb doubles. ✗
B. The power of the bulb decreases. ✗
C. The time the bulb can be kept lit increases. ✓

The true statement(s) is/are:

- (1) A only (2) B only (3) C only
(4) B and C only (5) All A, B, and C are true.



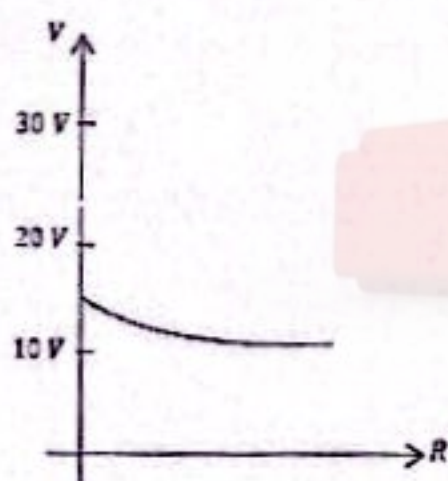
38. The relative humidity of a room of volume $5 m^3$ at $30^\circ C$ is 70%. The dew point of the room is $20^\circ C$ and saturated vapor density at $20^\circ C$ is $18 g m^{-3}$. If a mass 18g of water vapor is removed from the room at $30^\circ C$, the new relative humidity of the room is,

- (1) 50 % (2) 52 % (3) 60 % (4) 64 % (5) 69 %

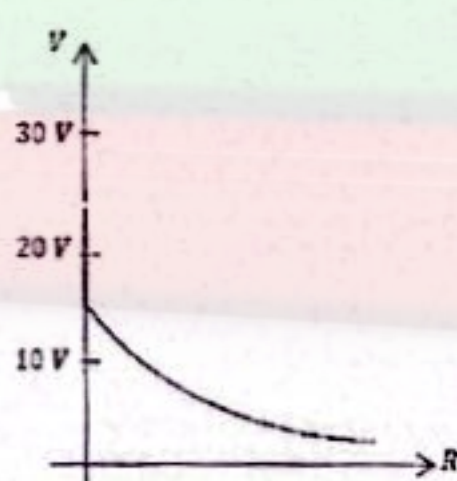
39. An object placed in front of a lens forms an image with a linear magnification of 3. When the original object is moved a 8 cm distance towards the lens, the linear magnification is 3. The focal length of the lens is:

- (1) 8 cm (2) 12 cm (3) 16 cm (4) 20 cm (5) 24 cm

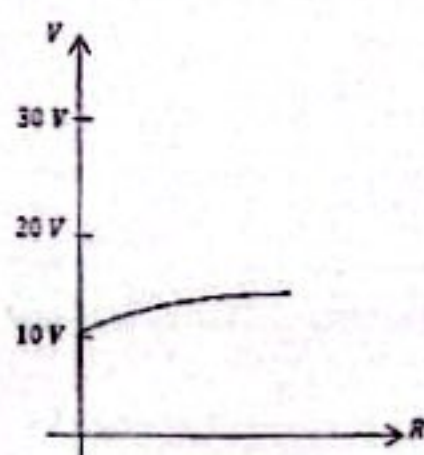
40. The internal resistance of the cell in the circuit shown in the figure is negligible. The voltmeter is ideal. The variation of the voltmeter reading V with the resistance value R is best represented by:



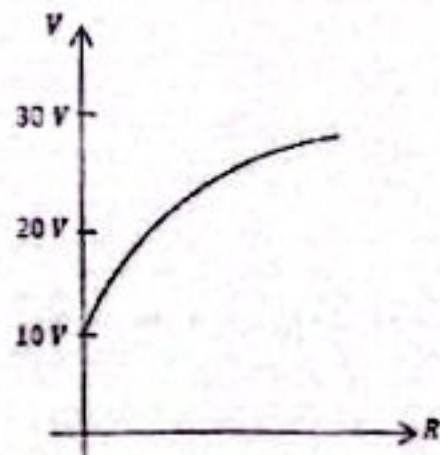
(1)



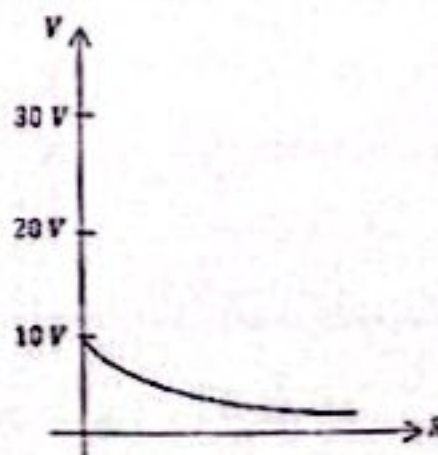
(2)



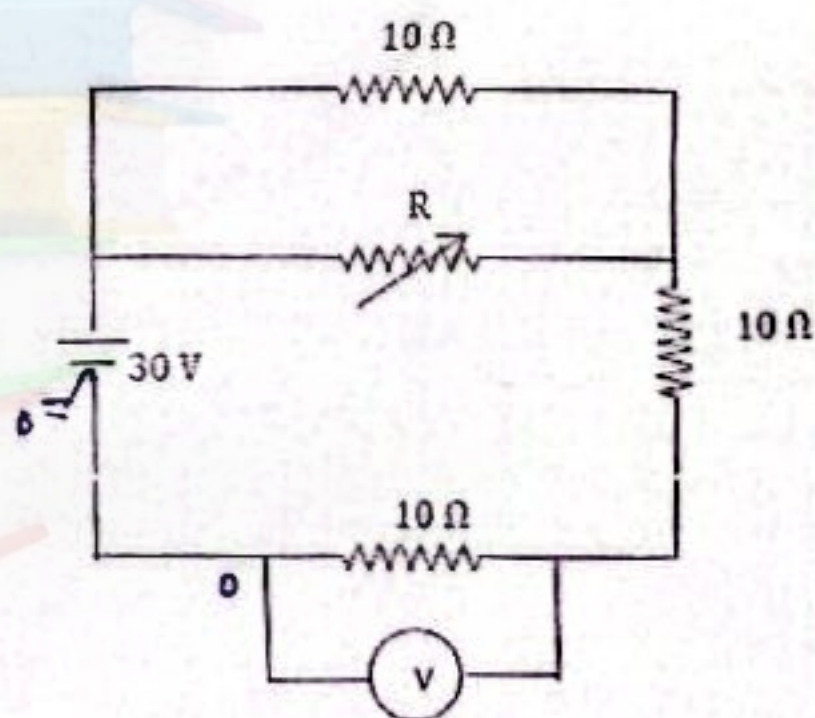
(3)



(4)



(5)

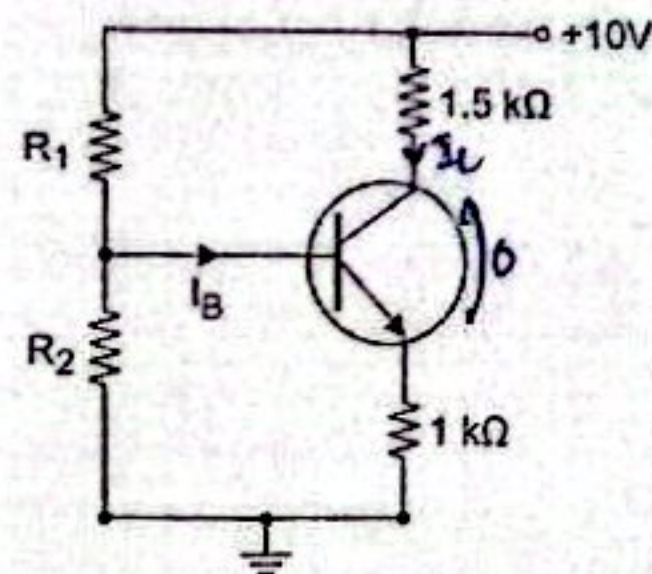


41. The breaking load of a wire of radius r and length l is 20 N . The breaking load of a wire made from the same material with radius $2r$ and length $3l$ is

- (1) 15 N (2) 40 N (3) 60 N (4) 80 N (5) 240 N

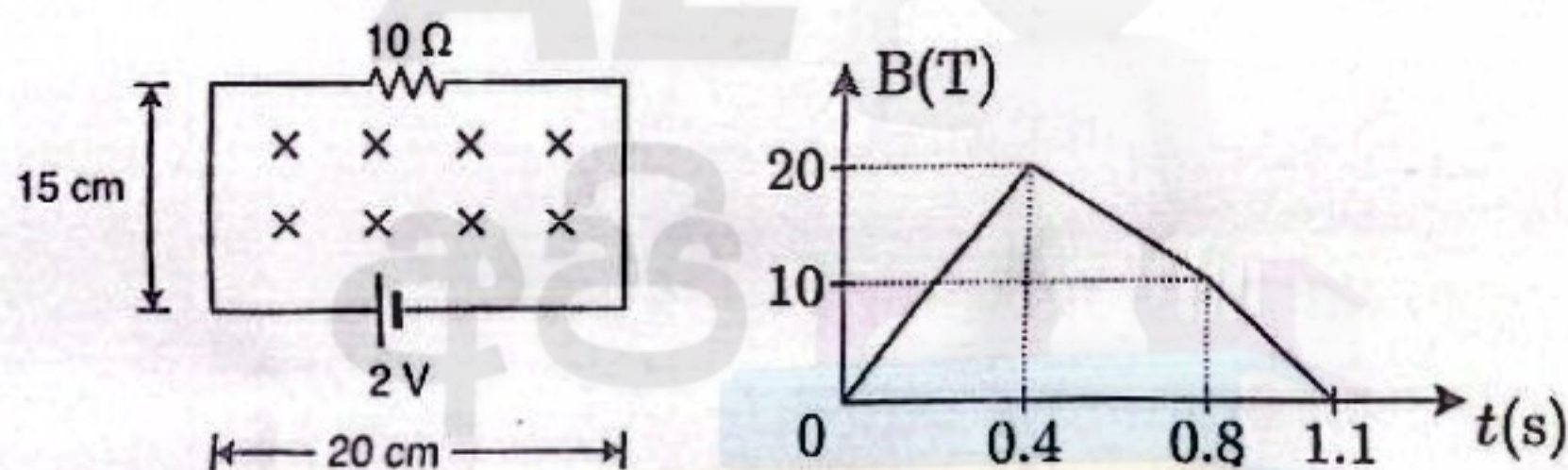
42. The current gain of the transistor shown in the figure is 100. The minimum base current (I_B) required to maintain the transistor in the saturation state is approximately:

- (1) $4\text{ }\mu\text{A}$ (2) $40\text{ }\mu\text{A}$ (3) 4 mA
(4) 25 mA (5) 40 mA



43. As shown in the figure, a potential difference of 2 V is supplied to a conducting loop of length 20 cm and width 15 cm , and it is placed perpendicular to a magnetic field. The variation of the magnetic flux density (B) into the plane with time (t) is shown in the graph.

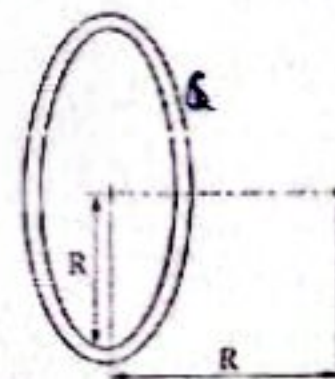
The maximum current flowing in the circuit is:



- (1) 0.1 A (2) 0.15 A (3) 0.2 A (4) 0.3 A (5) 0.35 A

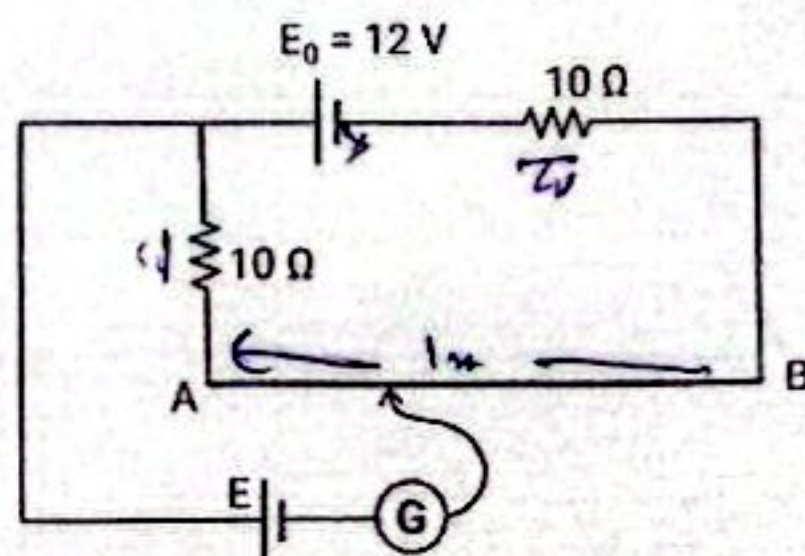
44. A charge Q is uniformly distributed on a ring of radius R . The electric potential at a point on the axis passing through the center at a distance R from the center is:

- (1) $\frac{1}{4\pi\epsilon_0} \frac{Q}{\sqrt{2}R}$ (2) $\frac{1}{4\pi\epsilon_0} \frac{Q}{2R}$ (3) $\frac{1}{4\pi\epsilon_0} \frac{Q}{R}$
(4) $\frac{1}{4\pi\epsilon_0} \frac{\sqrt{2}Q}{R}$ (5) $\frac{1}{4\pi\epsilon_0} \frac{2Q}{R}$

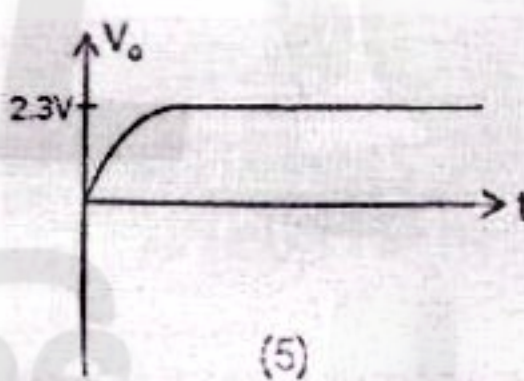
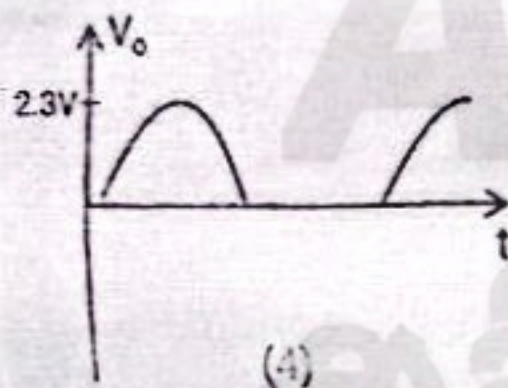
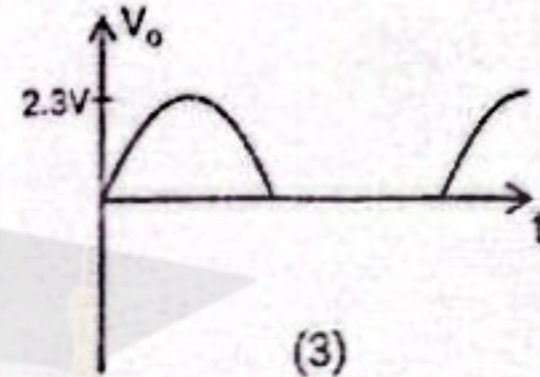
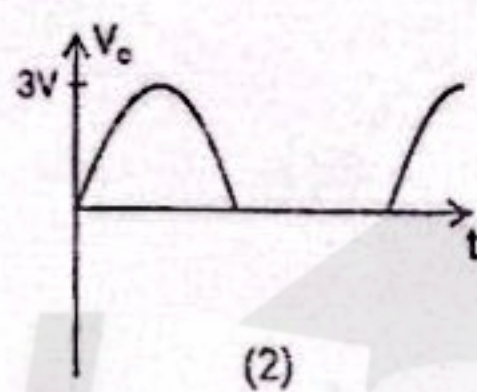
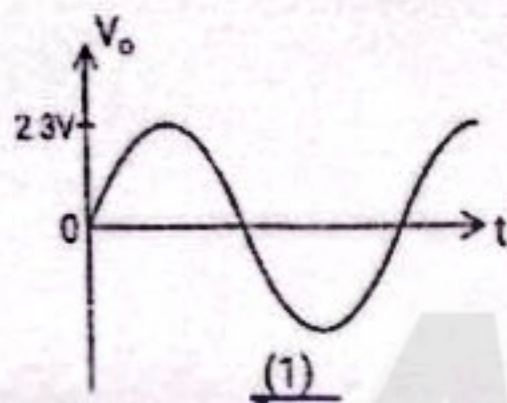
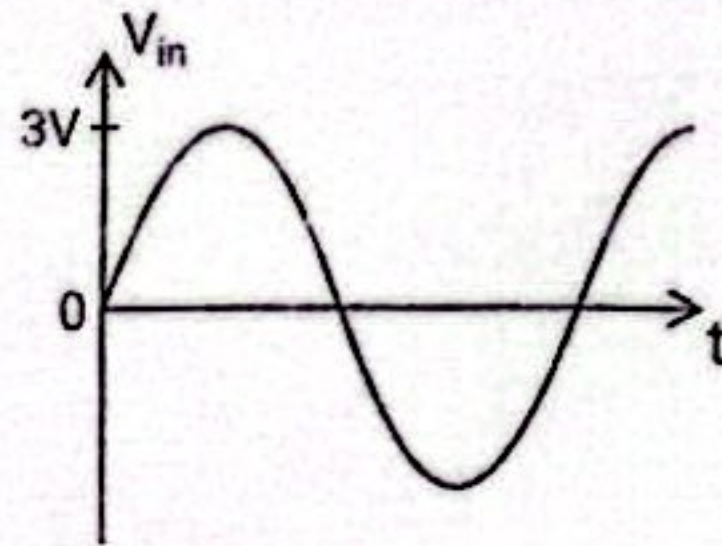
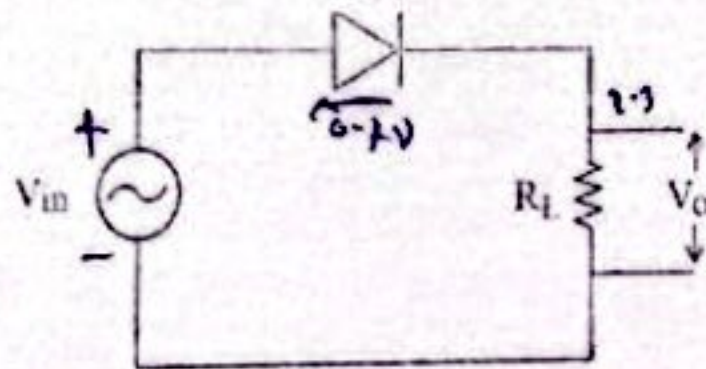


45. The resistance of the uniform potentiometer wire of length 1 m shown in the figure is $10\text{ }\Omega$. The internal resistance of E_0 is negligible. If the balancing length for the cell E is 25 cm , the electromotive force (EMF) of E is:

- (1) 4 V (2) 5 V (3) 6 V
(4) 7 V (5) 8 V



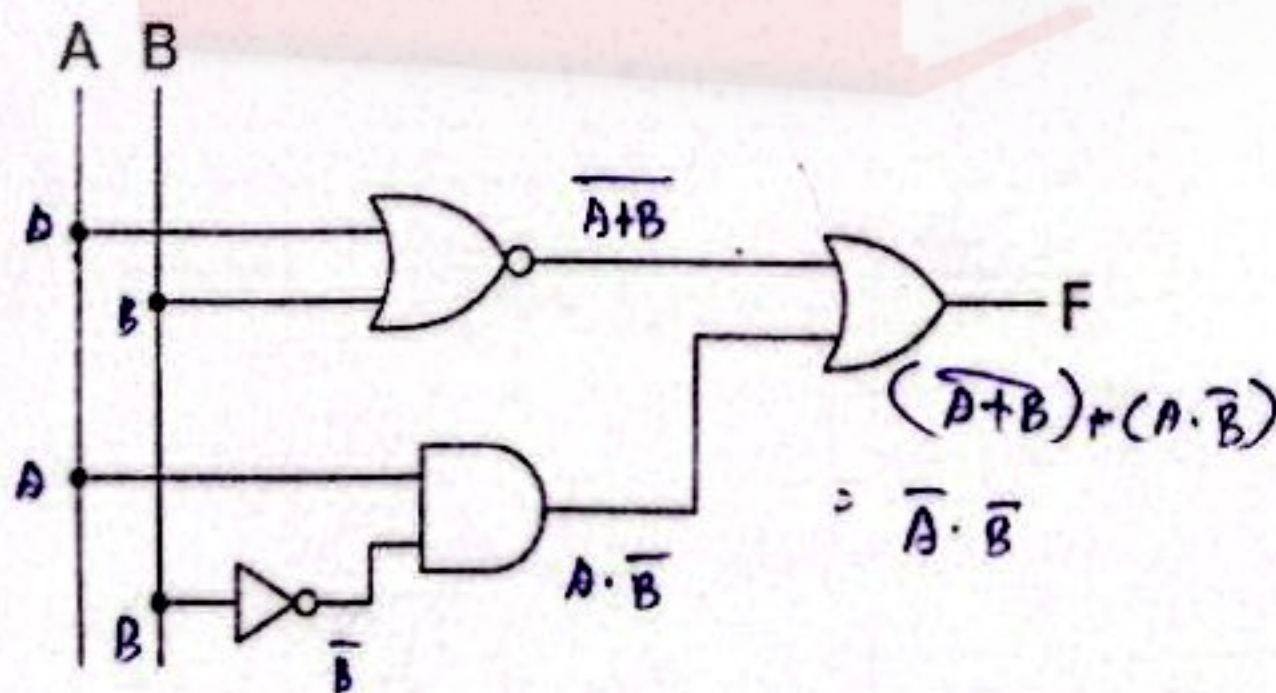
46. The figure shows a half-wave rectifier circuit constructed using a Si diode. The graph shows the variation of the input voltage (V_{in}) with time (t). The variation of the output voltage (V_o) with time is best represented by,



47. A wooden ball attains a terminal velocity 25 ms^{-1} in air. When comparing densities, the density of air can be neglected relative to the density of the wood. When this wooden ball is placed on water, it floats with a volume $1/3$ of it submerged in water. The coefficient of viscosity of water is 50 times that of air. When the wooden ball is completely submerged in water and released, the terminal velocity it attains is:

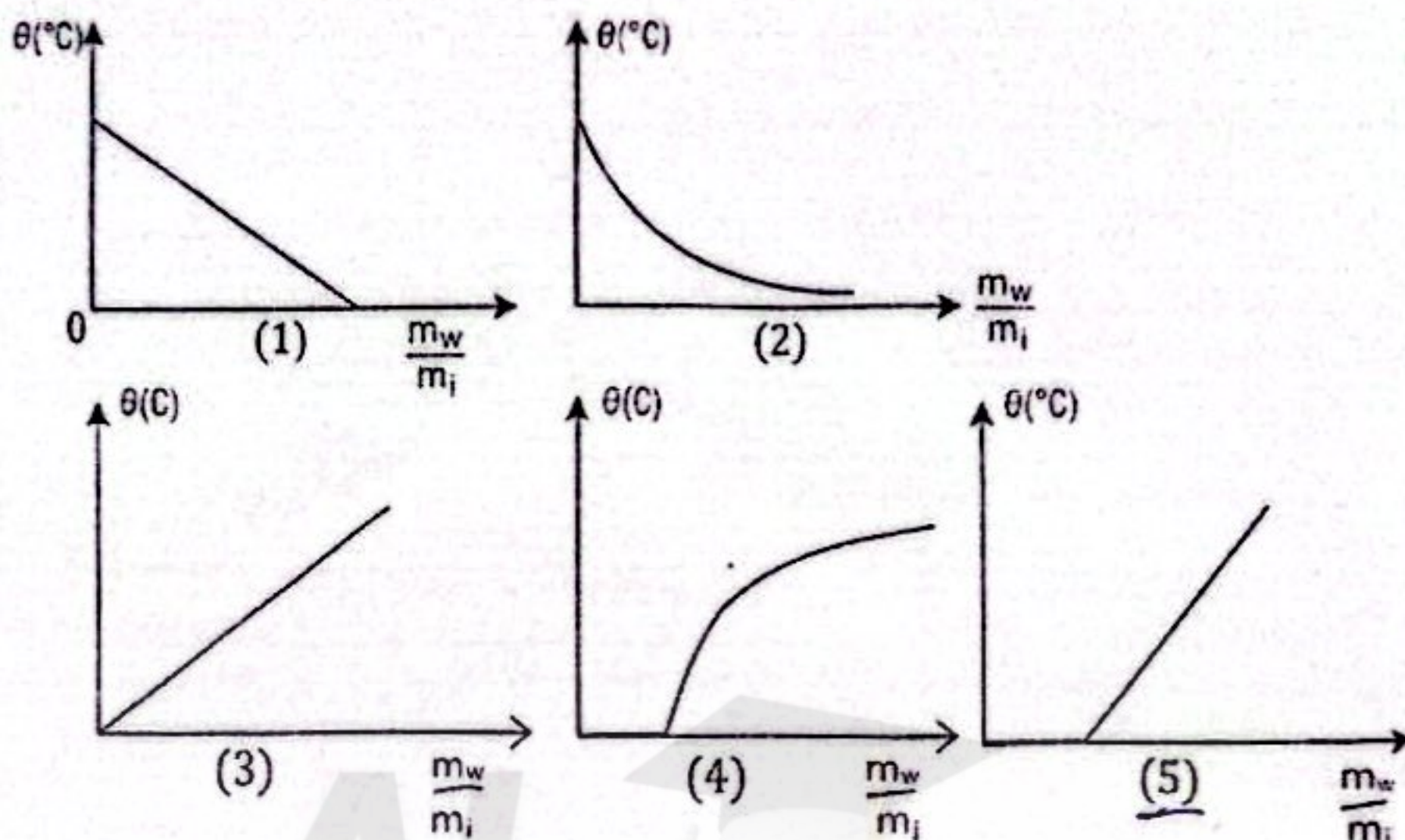
- (1) 0.5 ms^{-1} (2) 1 ms^{-1} (3) 1.5 ms^{-1} (4) 2 ms^{-1} (5) 3 ms^{-1}

48. The correct Boolean expression for the output F is



- (1) $F = A.B$ (2) $F = \bar{A}.\bar{B}$ (3) $F = \bar{A}.\bar{B} + A.\bar{B}$ (4) $F = \bar{A}.B + A.B$ (5) $F = \bar{A} + \bar{B}$

49. A mass m_i of ice at 0°C and a mass m_w of water at 80°C are mixed in a container of negligible heat capacity. The graph that best represents the variation of the equilibrium temperature (θ) with the mass ratio $\left(\frac{m_w}{m_i}\right)$ is:



50. Train A starts moving towards train B while sounding a horn with a frequency f_0 . After a time t_1 , train B also begins to move. The variation of the velocities of trains A and B with time is shown in the graph. During the period of motion, train A does not overtake train B. The variation of the frequency of the horn heard by a passenger in train (f) is best represented by:

