

**MEMORY BASED QUESTIONS JEE–MAIN EXAMINATION – APRIL 2026**

(HELD ON SUNDAY 05<sup>th</sup> APRIL 2026)

TIME : 9:00 AM TO 12:00 NOON

**PHYSICS**

**TEST PAPER WITH SOLUTION**

1. If R = resistance, L = inductance, C = capacitance, then dimension  $[ML^2T^{-4}A^{-2}]$  represents :-

- (1)  $\frac{R}{\sqrt{LC}}$                       (2)  $\frac{1}{R}\sqrt{\frac{L}{C}}$   
 (3)  $R\sqrt{LC}$                       (4)  $\sqrt{RLC}$

Ans. (1)

Sol. Dimension of resistance

$$\Rightarrow [R] = \left[ \frac{V}{I} \right] = ML^2T^{-3}A^{-2}$$

$$\frac{1}{\sqrt{LC}} \text{ is angular frequency so } \omega = \frac{1}{\sqrt{LC}}$$

$$[\omega] = T^{-1}$$

$$\text{Thus, } \left[ \frac{R}{\sqrt{LC}} \right] = ML^2T^{-3}A^{-2} \times T^{-1} = ML^2T^{-4}A^{-2}$$

2. If speed of light is  $2.12 \times 10^8$  m/s in medium of equilateral prism then find out minimum angle of deviation.

- (1)  $45^\circ$                       (2)  $60^\circ$   
 (3)  $30^\circ$                       (4)  $53^\circ$

Ans. (3)

$$\text{Sol. } \mu = \frac{\sin \left[ \frac{\delta_{\min} + A}{2} \right]}{\sin \frac{A}{2}}$$

$$\mu = \frac{C}{V} = \frac{3 \times 10^8}{2.12 \times 10^8} = \sqrt{2}$$

$$\sqrt{2} = \frac{\sin \left[ \frac{\delta_{\min} + 60^\circ}{2} \right]}{\sin 30^\circ}$$

$$\sin \left[ \frac{\delta_{\min} + 60^\circ}{2} \right] = \frac{1}{\sqrt{2}}$$

$$\delta_{\min} + 60^\circ = 90^\circ \Rightarrow \delta_{\min} = 30^\circ$$

3. For ideal gas n : number of moles,  $C_v$  : molar specific heat at constant volume,  $\gamma$  = adiabatic exponent of gas,  $T_f$  : final temperature,  $T_i$  : initial temperature, R : gas constant.

$$\text{Assertion : } nC_v(T_f - T_i) = \frac{nR}{\gamma - 1}(T_f - T_i)$$

$$\text{Reason : } \gamma = 1 + \frac{2}{f}$$

- (1) Both **Assertion** and **Reason** are true and **Reason** is the correct explanation of **Assertion**.  
 (2) Both **Assertion** and **Reason** are true but **Reason** is **NOT** the correct explanation of **Assertion**.  
 (3) **Assertion** true but **Reason** is false.  
 (4) **Assertion** is false but **Reason** is true.

Ans. (2)

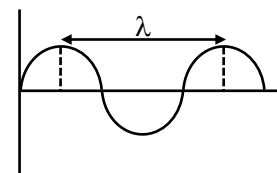
Sol. Using theory.

4. A travelling wave on string is given by the equation  $y = 3 \sin \left( 100t + 0.018x + \frac{\pi}{6} \right)$ , find the minimum distance (in m) between 2 crest.

- (1) 349.06                      (2) 625.75  
 (3) 475.56                      (4) 175.75

Ans. (1)

Sol.



Minimum distance between two crest =  $\lambda$

$$\text{From equation } K = \frac{2\pi}{\lambda}$$

$$0.018 = \frac{2\pi}{\lambda}$$

$$\lambda = \left( \frac{2\pi}{0.018} \right)$$

$$\lambda = 349.06 \text{ m}$$

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5. In hydrogen atom electron jump from state i to f. Radius of circular path of electron in state i & f are  $r_i$  &  $r_f$  if  $\frac{r_i}{r_f} = \frac{4}{1}$  and Rydberg constant  $R = 1.0976 \times 10^7 \text{ m}^{-1}$ , then find wavelength of emitted photon (in Å) ( $r_i$  &  $r_f$  are minimum possible radius).

Ans. (1215)

Sol.  $\frac{1}{\lambda} = Rz^2 \left[ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right]$   
 $\frac{1}{\lambda} = 1.0973 \times 10^7 (1)^2 \left[ \frac{1}{1} - \frac{1}{4} \right]$   
 $\lambda = 1215 \text{ \AA}$

6. If a metal rod has length  $\ell$  and area of cross-section A, its Young's modulus is Y. What will happen to Y if length is doubled and area halved.

- (1) Becomes double      (2) Becomes four time  
 (3) Becomes halved      (4) Remains same

Ans. (4)

Sol. Young's modulus is the property of material not depends on dimensions of material.

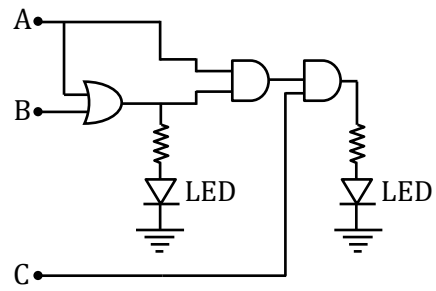
7. Two points A & B are 16 km from the surface of Earth. Point 'A' is above the surface of Earth while point 'B' is below the surface of Earth. Acceleration due to gravity at points A & B are  $g_A$  &  $g_B$  respectively. Then  $\frac{g_A}{g_B}$  is :- (Take radius of Earth = 6400 km)

- (1) 1                                      (2)  $\frac{398}{399}$   
 (3)  $\frac{399}{398}$                                       (4)  $\frac{1}{2}$

Ans. (2)

Sol.  $g_A = g \left( 1 - \frac{2h}{R_c} \right) = g \left( 1 - \frac{2 \times 16}{6400} \right)$   
 $g_B = g \left( 1 - \frac{d}{R_c} \right) = g \left( 1 - \frac{16}{6400} \right)$   
 $\frac{g_A}{g_B} = \frac{g \left( \frac{6400 - 32}{6400} \right)}{g \left( \frac{6400 - 16}{6400} \right)} = \frac{6368}{6384} = \frac{398}{399}$

8. LED (light emitting diode) and logic gates circuit is given in figure.



For what combination of A, B and C both LED will glow?

- (1) 101                                      (2) 100  
 (3) 010                                      (4) 001

Ans. (1)

Sol. For A = 1, B = 0 out put of OR gate is 1.

$\therefore$  LED 1 will glow

For C = 1, A = 1 & B = 1 or 0

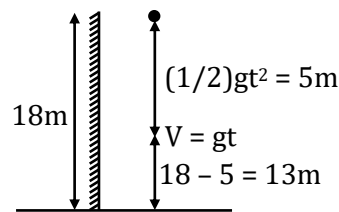
LED 2 will glow

9. A ball is dropped from a height 18 m above the ground. At any moment if magnitude of acceleration and velocity are same, then find its height above the ground at that instant.

- (1) 15 m                                      (2) 5 m  
 (3) 13 m                                      (4) 2 m

Ans. (3)

Sol.



At any time t after it is released velocity  $V = gt$

Acceleration of the ball remains constant = g

$\therefore$  Both will be equal at  $t = 1 \text{ sec}$

$\therefore$  Position of ball from ground will be  $(18 - 5) \text{ m}$



10. A charged particle is moving in a magnetic field

$$\vec{B} = (3\hat{i} + 2\hat{j}) \text{ T with acceleration } \vec{a} = 4\hat{i} - \frac{x}{2}\hat{j}$$

$\text{m/s}^2$ , find  $x$  ?

Ans. (12)

Sol.  $\vec{F}_B \propto (\vec{V} \times \vec{B})$

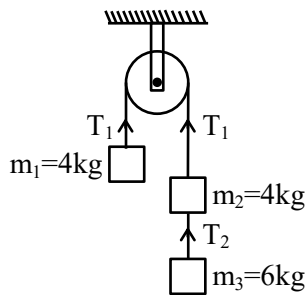
$$\vec{F}_B \perp \vec{B}$$

$$\vec{a} \perp \vec{B} \rightarrow \vec{a} \cdot \vec{B} = 0$$

$$12 - x = 0$$

$$x = 12$$

11. Find the ratio of  $T_1$  &  $T_2$



(1)  $\frac{5}{3}$

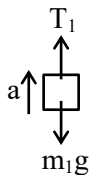
(2)  $\frac{3}{5}$

(3)  $\frac{10}{12}$

(4)  $\frac{12}{10}$

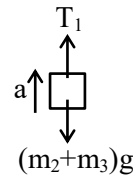
Ans. (1)

Sol.



$$T_1 - m_1g = m_1a$$

$$T_1 - 40 = 4a$$



$$(m_2 + m_3)g - T_1 = (m_2 + m_3)a$$

$$100 - T_1 = 10a$$

$$T_1 - 40 = 4\left(\frac{100 - T_1}{10}\right)$$

$$T_1 + \frac{2}{5}T_1 = 40 + 40$$

$$\frac{7}{5}T_1 = 80$$

$$T_1 = \frac{80 \times 5}{7} \text{ N}$$

$$m_3g - T_2 = m_3a$$

$$60 - 6a = T_2$$

$$60 - \frac{6}{10}\left[100 - \frac{400}{7}\right] = T_2$$

$$60 - \frac{6}{70} \times 300 = T_2$$

$$\frac{420 - 180}{7} = T_2$$

$$T_2 = \frac{240}{7} \text{ N}$$

$$\frac{T_1}{T_2} = \frac{400}{240} = \frac{5}{3}$$

12. In YDSE,  $\beta = 2.4 \text{ mm}$ , where  $\beta$  is fringe width. If setup is dipped in medium of refractive index  $\mu = 1.2$  find new fringe width (in mm)

(1) 4

(2) 2

(3) 8

(4) 6

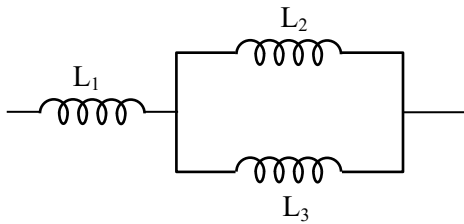
Ans. (2)

Sol.  $\beta' = \frac{\beta}{\mu} = \frac{2.4}{1.2} = 2 \text{ mm}$



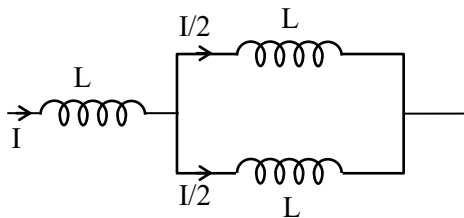
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13. In the below diagram inductance  $L_1 = L_2 = L_3$ . Find the ratio of total energy stored in all inductors to energy stored in inductor  $L_2$ .



Ans. (6)

Sol.



$$L_{eq} = L + \frac{L}{2} = \frac{3L}{2}$$

$$\frac{E_2}{E_{total}} = \frac{\frac{1}{2} \times L \times \left(\frac{I}{2}\right)^2}{\frac{1}{2} \times \frac{3L}{2} \times I^2} = \frac{1/4}{3/2} = \frac{1}{6}$$

$$\text{then, } \frac{E_{total}}{E_2} = \frac{6}{1}$$

14. In a vernier calliper, 1 main scale division equals 1 mm and 9 MSD was divided into 10 equal parts by vernier scale. When nothing was present in the jaw, zero of vernier scale lies to the right of zero of main scale and 7<sup>th</sup> division of vernier scale coincide with one of the main scale. Find zero error in the vernier calliper.

- (1) 0.3 mm                      (2) 0.7 mm  
(3) -0.3 mm                    (4) -0.07 mm

Ans. (2)

Sol. Since 9MSD = 10VSD

$$\therefore \text{L.C of vernier calliper} = 0.1 \text{ mm}$$

Since zero of vernier scale lies to the right of zero of main scale  $\Rightarrow$  +ve zero error.

$$\therefore \text{zero error} = +0.7 \text{ mm}$$

15. In an AC circuit with R & C having angular frequency  $\omega$  has peak current I and if angular frequency is  $\frac{\omega}{4}$  then peak current becomes  $\frac{I}{3}$ . Find the ratio of resistance and reactance at  $\omega$ .

- (1)  $\sqrt{\frac{8}{7}}$                       (2)  $\sqrt{\frac{2}{7}}$   
(3)  $\sqrt{\frac{7}{8}}$                       (4)  $\sqrt{\frac{9}{8}}$

Ans. (3)

Sol. As we know that current in RLC circuit is given by

$$I = \frac{V}{Z} = \frac{V}{[R^2 + (X_L - X_C)^2]^{1/2}}$$

$$I = \frac{V_0}{\sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2}}$$

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19. In a region where electric field exist as  $\vec{E} = -E_0 \hat{i}$ . Initially at  $t = 0$  velocity of particle of mass  $m$  is  $4v_0 \hat{i}$  then de-Broglie wavelength  $\lambda$  in terms of  $\lambda_0 = \frac{h}{4mv_0}$  at time  $t$  is :

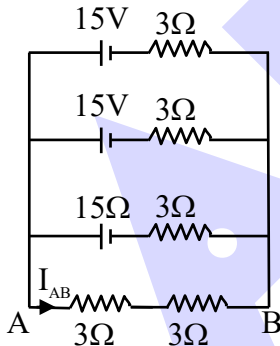
- (1)  $\lambda = \frac{h\lambda_0}{h + qE_0\lambda_0 t}$
- (2)  $\lambda = \frac{h\lambda_0}{h - qE_0\lambda_0 t}$
- (3)  $\lambda = \frac{h\lambda_0}{h + 2E_0q\lambda_0 t}$
- (4)  $\lambda = \frac{h\lambda_0}{h + \frac{qE_0\lambda_0 t}{2}}$

Ans. (2)

Sol. 
$$\lambda = \frac{h}{mv} = \frac{h}{m(4v_0 - \frac{qE_0}{m}t)} = \frac{h}{4mv_0 - qE_0 t}$$

$$= \frac{h}{\frac{h}{\lambda_0} - qE_0 t} = \frac{h\lambda_0}{h - qE_0\lambda_0 t}$$

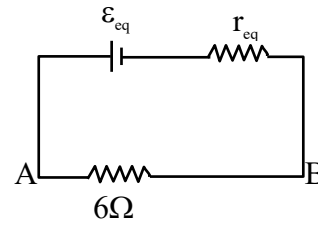
20. For the circuit shown below, find current across AB. ( $I_{AB}$ )



- (1)  $\frac{10}{7}$  A
- (2)  $\frac{13}{7}$  A
- (3)  $\frac{11}{7}$  A
- (4)  $\frac{15}{7}$  A

Ans. (4)

Sol. This circuit can be resolved to



$$\epsilon_{eq} = \frac{15}{\frac{1}{3} + \frac{1}{3} + \frac{1}{3}} + \frac{15}{\frac{1}{3} + \frac{1}{3} + \frac{1}{3}} + \frac{15}{\frac{1}{3} + \frac{1}{3} + \frac{1}{3}}$$

$$= \frac{15}{\frac{1}{3} \times 3} \times 3 = \frac{15}{1} \times 3 = 15 \text{ volt}$$

$$\frac{1}{r_{eq}} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$$

$$r_{eq} = 1$$

$$I_{AB} = \frac{\epsilon_{eq}}{6 + r_{eq}} = \frac{15}{1 + 6} = \frac{15}{7} \text{ A}$$

21. Displacement current inside a capacitor of capacitance  $6 \mu\text{F}$  is  $4\text{A}$ . Find the rate of change of voltage across capacitor.

- (1)  $6.6 \times 10^5$
- (2)  $5.2 \times 10^5$
- (3)  $1.3 \times 10^6$
- (4)  $2.4 \times 10^6$

Ans. (1)

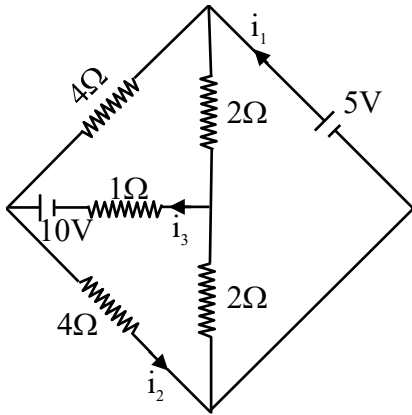
Sol.  $i_d = C \frac{dV}{dt}$

$$4 = 6 \times 10^{-6} \left( \frac{dV}{dt} \right)$$

$$\frac{dV}{dt} = 6.6 \times 10^5 \text{ volts}$$



22.

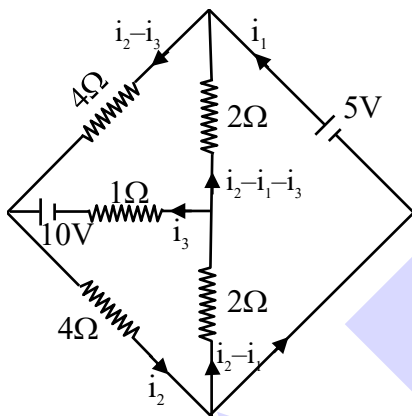


Correct option for this circuit is:

- (1) Current  $i_1 = \frac{15}{16}$  A      (2) Current  $i_2 = \frac{15}{8}$  A  
 (3) Current  $i_3 = \frac{5}{4}$  A      (4) Current  $i_3 = \frac{5}{8}$  A

Ans. (2)

Sol.

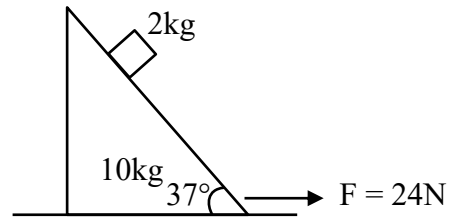


$$\begin{aligned}
 -2(i_2 - i_1 - i_3) - 4(i_2 - i_3) - 10V + i_3 &= 0 \\
 2i_1 - 6i_2 + 7i_3 &= 10 \quad \dots(1) \\
 -2(i_2 - i_1) - i_3 + 10 - 4i_2 &= 0 \\
 -2i_1 + 6i_2 + i_3 &= 10 \quad \dots(2) \\
 5 - 4(i_2 - i_3) - 4i_2 &= 0 \\
 8i_2 - 4i_3 &= 5 \quad \dots(3)
 \end{aligned}$$

solving 1, 2, 3

$$\begin{aligned}
 i_3 &= \frac{5}{2} \\
 i_2 &= \frac{15}{8} \\
 i_1 &= \frac{15}{8}
 \end{aligned}$$

23. Find time taken by block to slide a distance 8.8 m w.r.t wedge (in sec). All surfaces are smooth.

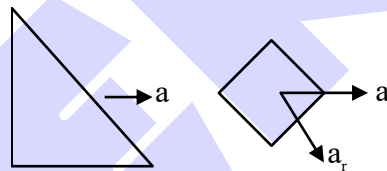


- (1) 1.89      (2) 1.29  
 (3) 1.76      (4) 2

Ans. (1)

Sol. For system:

$$24 = 10a + 2(a + a_r \cos 37^\circ)$$



$$\Rightarrow 24 = 12a + \frac{8a_r}{5} \quad \dots(1)$$

For block w.r.t wedge

$$m g \sin 37^\circ - m a \cos 37^\circ = m a_r$$

$$6 - \frac{4}{5}a = a_r \quad \dots(2)$$

solving (1) & (2)

$$24 = 12 \left( \frac{5}{4}(6 - a_r) \right) + \frac{8a_r}{5}$$

$$24 = 15(6 - a_r) + \frac{8a_r}{5}$$

$$a_r = \frac{66}{67/5} = 4.92 \text{ m/s}^2$$

time taken:

$$S = \frac{1}{2} \times 4.92 t^2$$

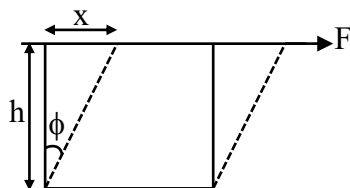
$$t = 1.89 \text{ s}$$



24. A cube of side length 5 cm having modulus of rigidity  $10^5 \text{N/m}^2$ . The top is pulled by a force 10 N, while the bottom is fixed. Find the displacement of upper surface of cube in (mm)

Ans. [2]

Sol.



$$\eta = \frac{F/A}{\phi} = \frac{Fh}{Ax}$$

$$x = \frac{Fh}{A\eta} = \frac{10 \times 5 \times 10^{-2}}{25 \times 10^{-4} \times 10^5} = \frac{1}{500} \text{m}$$

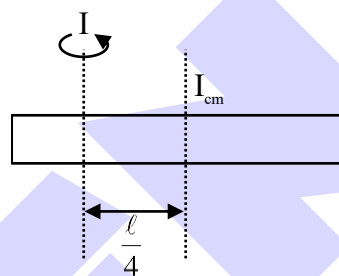
$$\therefore x = 2 \text{ mm}$$

25. Moment of inertia of rod about an axis passing through point at distance  $\frac{\ell}{4}$  from center and perpendicular to rod is- (The uniform rod is of mass m and length  $\ell$ )

- (1)  $\frac{7m\ell^2}{48}$                       (2)  $\frac{3m\ell^2}{48}$   
 (3)  $\frac{4m\ell^2}{48}$                       (4)  $\frac{m\ell^2}{48}$

Ans. (1)

Sol.



$$\begin{aligned} I &= I_{cm} + md^2 \\ &\Rightarrow \frac{m\ell^2}{12} + \frac{m\ell^2}{16} \\ &= \frac{4m\ell^2 + 3m\ell^2}{48} \\ &= \frac{7m\ell^2}{48} \end{aligned}$$



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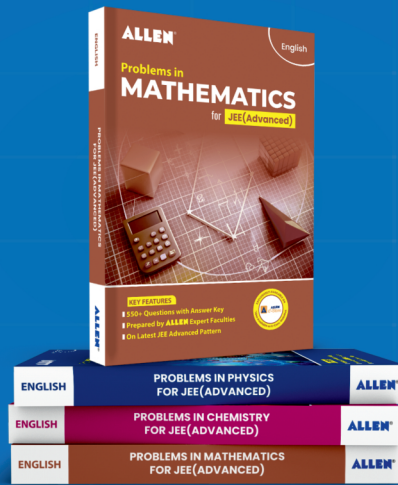
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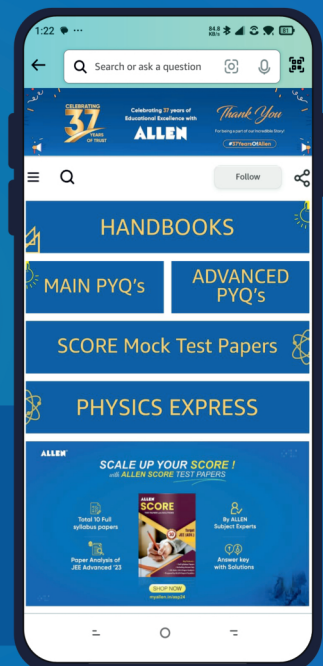
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