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JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-1

DATE & DAY: 06th April 2026 & Monday

PAPER-1

Duration: 3 Hrs.
Time: 09:00 – 12:00 IST

SUBJECT: PHYSICS

REGISTERED & CORPORATE OFFICE (CIN: U80302RJ2007PLC024029):
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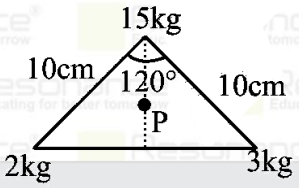
PART : PHYSICS

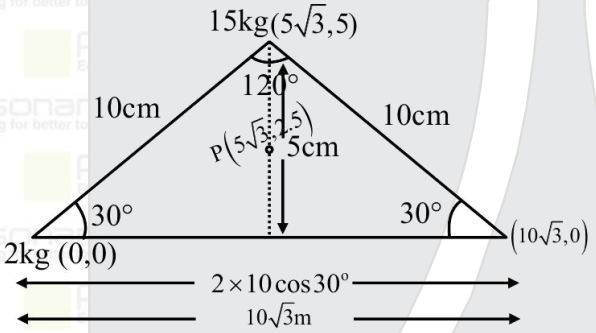
1. If P is the midpoint of median. Find distance of COM from P .



(1) 6.18 (2) 5.18 (3) 6.88 (4) 1.32

Ans. **(4)**

Sol.



$$X_{cm} = \frac{2\times 0 + 15\times 5\sqrt{3} + 3\times 10\sqrt{3}}{20} = \frac{21\sqrt{3}}{4}$$

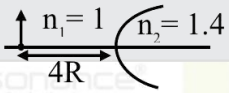
$$Y_{cm} = \frac{0\times 2 + 15\times 5 + 3\times 0}{20} = \frac{15}{4}$$

$$\text{Distance} = \sqrt{(5.25\sqrt{3} - 5\sqrt{3})^2 + (3.75 - 2.5)^2}$$

$$= \sqrt{(0.25\sqrt{3})^2 + (1.25)^2} = \sqrt{1.75}$$

$$= 1.32$$

2. Find tranverse magnification due to curved boundary between two mediums.



(1) -1.5 (2) -1.67 (3) +1.2 (4) -0.8

Ans. **(2)**

Sol. $m = \frac{n_1}{n_2}\frac{v}{u}$

$$\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$$

$$\frac{1.4}{v} + \frac{1}{4R} = \frac{1.4 - 1}{R}$$

$$\frac{1.4}{v} = \frac{4}{10R} - \frac{1}{4R}$$

$$v = \frac{56R}{6} = +\frac{28}{3}R$$

$m = \frac{1}{1.4} \cdot \frac{28R/3}{(-4R)} = -1.67$

3. In YDSE a glass slab of thickness 8μ m is introduced in front of a slit. If central maxima shifts to the position of 4^{th} minima, then find refractive index of glass slab ($\lambda = 500$ nm) :-

(1) $\mu = 1.11$ (2) $\mu = 1.22$ (3) $\mu = 1.32$ (4) $\mu = .22$

Ans. **(2)**

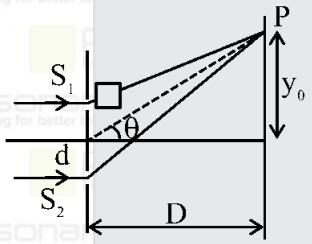
Sol. $S_2P - [S_1P + (\mu - 1)t] = n\lambda$

$n = 0(CBF)$

$d\sin\theta - (\mu - 1)t = 0$

$\frac{dy_0}{D} = (\mu - 1)t$

Shift $= y_0 = (\mu - 1)t\frac{D}{d}$



Minima : $y_n = \left(n + \frac{1}{2}\right)\frac{D\lambda}{d}$

$n = 3$ is 4th minima

$y_1 = \left(3 + \frac{1}{2}\right)\frac{D\lambda}{d} = \frac{7}{2}\frac{D\lambda}{d}$

$y_0 = y_1$

$(\mu - 1)t\frac{D}{d} = \frac{7}{2}\frac{D\lambda}{d} \Rightarrow (\mu - 1) = \frac{7\lambda}{2t} = \frac{7}{2} \times \frac{500 \times 10^{-9}}{8 \times 10^{-6}}$

$\Rightarrow \mu - 1 = 3.5 \times 62.5 \times 10^{-3} = 0.218 = 0.22$

$\Rightarrow \mu = 1.22$

4. Potential energy of a particle is given as $u = \frac{A\sqrt{x}}{B+x}$.Find dimension of A and B :-

(1) $M^3\ L^{3/2}\ T^{-2}$, L (2) $ML^{5/2}\ T^{-1}$, L^2 (3) $ML^{5/2}\ T^{-2}$, L (4) $ML^{7/2}\ T^{-3}$, L

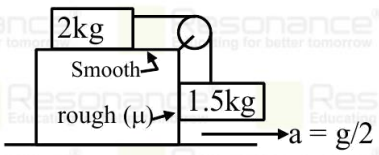
Ans. **(3)**

Sol. $[B] = [x] = L$

$[U] = \left[\frac{A\sqrt{x}}{B + x}\right] \Rightarrow ML^2\ T^{-2} = \frac{[A]L^{1/2}}{L}$

$[A] = ML^{5/2}\ T^{-2}$

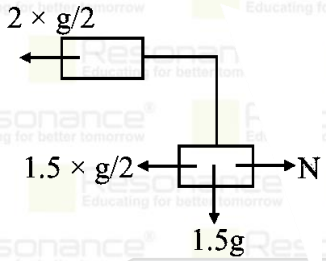
5. Find μ so that blocks are at rest :



(1) $\frac{1}{3}$ (2) $\frac{2}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{2}$

Ans. **(2)**

Sol. w.r.t bigger block



$f = \mu N = \mu \times \frac{1.5\ g}{2}$

$1.5\ g = g + \mu + \frac{1.5\ g}{2} \Rightarrow 0.5 = \mu \times \frac{1.5}{2}$

$\left(\mu = \frac{2}{3}\right)$

6. In AC circuit supply voltage $(V_{rms}) = 1000\ V, R = 80\Omega, X_L = 80\Omega$ & source frequency $f = 50\ Hz$. Find the power factor.

(1) $\frac{1}{\sqrt{2}}$ (2) $\frac{1}{\sqrt{3}}$ (3) $\frac{1}{\sqrt{5}}$ (4) $\frac{1}{\sqrt{6}}$

Ans. **(1)**

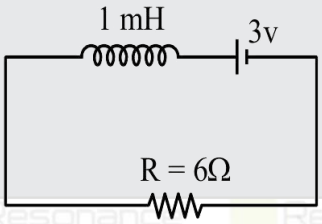
Sol. Power factor, $\cos\phi = \frac{R}{Z}$

$z = \sqrt{R^2 + X_L{}^2} = 80\sqrt{2}\Omega$

$\cos\phi = \frac{80}{80\sqrt{2}}$

$\cos\phi = \frac{1}{\sqrt{2}}$

7. For the given circuit, find ratio of instantaneous voltage across inductor when current is 2 mA & when current is 4 mA .



(1) 1.5 (2) 1 (3) 2 (4) 1.25

Ans. **(2)**

Sol. At $i = 2\ mA$

$\Delta V_R = iR = 2 \times 10^{-3} \times 6 = 0.012\ V$

$\Delta V_{ind} = 3 - 0.012 = 2.988\ V$

$AtI = 4\ mA$

$\Delta V_{ind} = iR = 4 \times 10^{-3} \times 6 = 0.024$

$\Delta V_{ind} = 3 - 0.024 = 2.976$

$\text{Ratio} = \frac{2.988}{2.976} = 1.00403$

8. A sphere of mass 5 kg and radius 4 cm is rotating about fixed axis about diameter with 1200 r.p.m. To stop it in 10 sec , a torque is applied. Find magnitude of torque required and revolution made before it stops. Respectively :-

(1) $0.08\ \mathrm{N-m}$ and 50 Rev . (2) $0.04\ \mathrm{N-m}$ and 100 Rev.

(3) $0.016\ \mathrm{N-m}$ and 200 Rev. (4) $0.2\ \mathrm{N-m}$ and 100 Rev .

Ans. **(2)**

Sol. $w_i = 1200\text{rpm} = 1200 \times \frac{2\pi}{60} = 40\pi\text{rad/sec}$

$\rightarrow w_f = w_i + \alpha t \Rightarrow 0 = 40p + \alpha(10)$

$\alpha = -4\pi\text{rad/sec}^2$

$\rightarrow I = \frac{2}{5}MR^2 = \frac{2}{5}(5)(0.04)^2 = 2 \times 0.0016$

$I = 0.0032\text{Kg} - \text{m}^2$

$\rightarrow \tau = I\alpha = 0.0032 \times 4\pi$

$\tau = 0.04\ \text{N} - \text{m}$

$\rightarrow w_f^2 = w_i^2 + 2\alpha\phi\&$

$0 = (40\pi)^2 + 2(4\pi)\theta$

$\theta = \frac{1600\pi^2}{8\pi} = 200\pi$

No. of revolution $= \frac{\theta}{2\pi} = \frac{200\pi}{2\pi}$

No. of revolution $= 100$

9. Intensity of two sources is same and path difference at point A and B are $\frac{\lambda}{6}$ and $\frac{\lambda}{3}$ respectively. Ratio of intensity at A& B will be.

(1) 3 (2) 4 (3) $\frac{1}{3}$ (4) $\frac{1}{4}$

Ans. **(1)**

Sol. $\Delta\phi)_A = \frac{2\pi}{\lambda} \times \frac{\lambda}{6} = \frac{\pi}{3}$

$\therefore I)_A = I + I + 2\sqrt{I} \cdot \sqrt{I} \cdot \cos\left(\frac{\pi}{3}\right)$

$= 2I + 2I\frac{1}{2} = 3I$

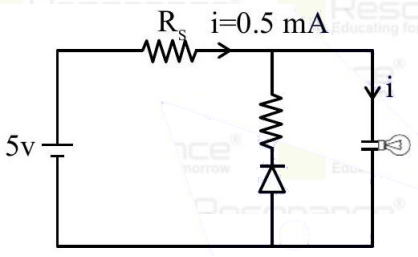
$\Delta\phi)_B = \frac{2\pi}{\lambda} \times \frac{\lambda}{3} = \frac{2\pi}{3}$

$\therefore I)_A = I + I + 2\sqrt{I} \cdot \sqrt{I} \cdot \cos\left(\frac{2\pi}{3}\right)$

$= 2I - I = I$

$\therefore \frac{I_A}{I_B} = \frac{3I}{I} = 3$

10. Find minimum R_s so that LED light does not get damaged (power rating of LED is 2 mW):-



(1) 1Ω (2) 2Ω (3) 3Ω (4) 4Ω

Ans. **(2)**

Sol. Diode in reverse bias so no current in it.

$P_{bulb} = 2 \times 10^{-3} = V_{bulb}$

$v_{bulb} = 4\ V$

So $5\ V = V_{RS} + V_{bulb}$

$V_{rs} = 5 - 4 = 1$

$1 = 0.5R_s \Rightarrow R_s = 2\Omega$

11. The dimension of a solid cylinder is measured as given

Mass $= 19.42 \pm 0.02$ kg

Diameter $= 20.20 \pm 0.02$ cm

Length $= 10.10 \pm 0.02$

Find out % error in density.

(1) 0.5% (2) 0.3% (3) 0.4% (4) 0.7%

Ans. **(1)**

Sol. $\rho = \frac{4M}{\pi d^2 \ell}$

$\frac{d\rho}{\rho} = \frac{dM}{M} + \frac{d\ell}{\ell} + \frac{2dd}{d}$

$\frac{d\rho}{\rho} = \left(\frac{0.02}{19.42} + \frac{0.02}{10.10} + \frac{2 \times 0.02}{20.20}\right) \times 100 = 0.5\%$

12. Electric field in space is given by $\vec{E} = 2x\hat{\imath} + 3y^2\hat{\jmath} + 4\hat{k}$. A charge $q = 3C$ is taken from $r_i(0,-1,-3)$ to $r_f(5,1,2)$. Find magnitude of ΔU

Ans. **(47)**

Sol. $\Delta U = -w_{electrostatic} = -\int 2xdx - \int 3y^2dy - \int 4dz$

$= (-x^2 - y^3 - 4z)_{(0,-1,-3)}^{(5,1,2)}$

$= -[25 + 2 + 20]$

$= -47\ J$

13. Bulk's modulus of an ideal gas for isothermal process initially is B . Gas is compressed from volume V_0 to $\frac{V_0}{3}$ isothermally. Find the work done by gas.

(1) $BV_0 \ell n3$ (2) $\frac{BV_0}{3} \ell n3$ (3) $BV_0 \ln\left(\frac{1}{3}\right)$ (4) $3BV_0 \ln\left(\frac{1}{2}\right)$

Ans. **(3)**

Sol. For isothermal process initially $B = P_0$.

$W = nRT\ln\left(\frac{V_2}{V_1}\right)$

$= P_0\ V_0 \ln\left(\frac{1}{3}\right)$

$W = BV_0 \ln\left(\frac{1}{3}\right)$

14. A particle is performing SHM of amplitude A. Find the time required for particle to go from mean position to $\frac{A}{\sqrt{2}}$. Time period of SHM is 5 secs :-

(1) $\frac{5}{4}$ sec. (2) $\frac{5}{12}$ sec. (3) $\frac{5}{8}$ sec. (4) $\frac{5}{6}$ sec.

Ans. **(3)**

Sol.

$x = 0 \rightarrow \theta = 0°$

$x = \frac{A}{\sqrt{2}} \rightarrow \theta = \frac{\pi}{4}$

$\therefore$ phase covered $= \frac{\pi}{4}$

$\text{time} = \frac{\text{phase}}{w} = \frac{\pi}{4w} = \frac{\pi}{4} \times \frac{T}{2\pi} = \frac{T}{8}$

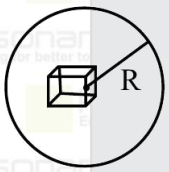
$\therefore t = \frac{5}{8}$ secs.

15. A cube of side 1 mm is placed at centre of circular coil of radius 10 cm . current flowing in coil is 2 A . Find magnetic field energy stored in cube. ($\pi = 3.14$)

(1) 1.57×10^{-14} J (2) 6.28×10^{-14} J (3) 12.56×10^{-14} J (4) 9.42×10^{-14} J

Ans. **(2)**

Sol. Magnetic field at centre $B = \left(\frac{\mu_0}{4\pi}\right)\frac{2\pi i}{R}$



$= \frac{10^{-7} \times 2 \times \pi \times 2}{10 \times 10^{-2}}$

So energy stored

$U = \frac{B^2}{2\mu_0} \times V$

$= \frac{10^{-14} \times 4 \times \pi^2 \times 4 \times 100}{2 \times 4\pi \times 10^{-7}} \times (1 \times 10^{-9})$

$= 2\pi \times 10^{-14}$ J

$= 6.28 \times 10^{-14}$ J

16. Unpolarised light with intensity I_0, incident on polariser. Find angle between axis of polarises and analyser so that intensity of emergent light becomes $\frac{3I_0}{8}$:-

(1) $60°$ (2) $30°$ (3) $90°$ (4) $0°$

Ans. **(2)**

Sol. $\underset{\text{(Unpolarised)}}{I_0} \rightarrow \underset{\text{(Polarised)}}{\frac{I_0}{2}} \xrightarrow{\text{Analyser}}$

$I = I'\cos^2\theta$

$\frac{3I_0}{8} = \frac{I_0}{2}\cos^2\theta$

$\cos\theta = \frac{\sqrt{3}}{2}$

$\theta = 30°$

17. Shortest wavelength of Lyman is x, then difference of wavelengths of 1st Balmer and 2nd Balmer line is terms of x will be :-

(1) $\left(\frac{28}{15}\right)x$ (2) $\left(\frac{26}{15}\right)x$ (3) $\left(\frac{13}{15}\right)x$ (4) $\left(\frac{11}{15}\right)x$

Ans. **(1)**

Sol. $\lambda = \frac{91.2 \text{ nm}}{z^2\left(\frac{1}{n_1^2}-\frac{1}{n_2^2}\right)}$

H -atom 1st lyman $x = 91.2$ nm

1st Balmer $\lambda_1 = \frac{91.2}{\left(\frac{1}{4}-\frac{1}{9}\right)} = \frac{36x}{5}$

2nd Balmer $\lambda_2 = \frac{91.2}{\left(\frac{1}{4}-\frac{1}{16}\right)} = \frac{16}{3}x$

$\lambda_1 - \lambda_2 = \left(\frac{36}{5}-\frac{6}{3}\right)x = \frac{28}{15}x$

18. A small drop of mass 1 gm starts falling from rest from a height of 1 km . When it reaches the ground with speed of 5 m/s, magnitude of work done by resistance force is $x \times 10^{-3}$ J. Find x: –

(1) 845 (2) 247.5 (3) 987.5 (4) None of these

Ans. **(3)**

Sol. $w_g + w_{res} = \Delta k$

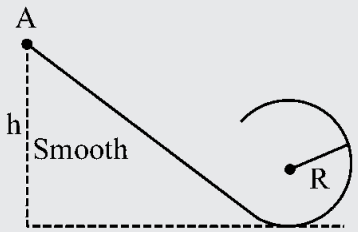
$mgh + w_{res} = \frac{1}{2}mv^2$

$\therefore w_{res} = \frac{1}{2}mv^2 - mgh$

$= 10^{-3}\left(\frac{25}{2} - 10^4\right)$

$= 987.5 \times 10^{-3}$ J

19. A particle is released from point A of track as shown in figure find h so that normal reaction at highest point is 3 times the weight of block :-



(1) $h = 4R$ (2) $h = 3R$ (3) $h = 2.5R$ (4) $h = 6R$

Ans. **(1)**

Sol. at highest point

$mg + N = \frac{mv^r}{R}$

$4mg = \frac{mv^r}{R}$

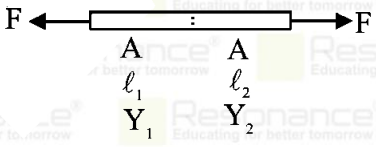
$v = \sqrt{4gR}$

Now energy conservation

$mg(h - 2R) = \frac{1}{2}\ m \times 4gR$

$(\ h = 4R\ )$

20. Two wires are joint together and is elongated with force as shown in figure.



If $\frac{Y_1}{Y_2}=\frac{20}{11}$. Find out $\frac{\ell_1}{\ell_2}$ so that they have same elongation.

(1) $\frac{11}{20}$ (2) $\frac{20}{11}$ (3) $\frac{11}{10}$ (4) $\frac{10}{11}$

Ans. **(2)**

Sol. $\Delta\ell=\frac{T\ell}{YA}$

$\ell \propto Y$

$\frac{\ell_1}{\ell_2}=\frac{Y_1}{Y_2}=\frac{20}{11}$

21. Find the ratio of momentum of photons of 1^{st} &2^{nd} line of Balmer series of hydrogen atom.

(1) $\frac{10}{20}$ (2) $\frac{11}{27}$ (3) $\frac{15}{20}$ (4) $\frac{20}{27}$

Ans. **(4)**

Sol. $p=\frac{h}{\lambda}$

$\frac{1}{\lambda_1}=R\left(\frac{1}{2^2}-\frac{1}{3^2}\right)=R\left(\frac{1}{4}-\frac{1}{9}\right)$

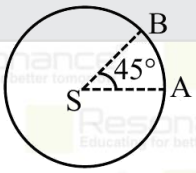
$\frac{1}{\lambda_1}=R\frac{5}{36}$

$\frac{1}{\lambda_2}=R\left(\frac{1}{2^2}-\frac{1}{4^2}\right)=R\left(\frac{1}{4}-\frac{1}{16}\right)$

$\frac{1}{\lambda_2}=\frac{3R}{16}$

$\frac{p_1}{p_2}=\frac{\lambda_2}{\lambda_1}=\frac{\frac{16}{3R}}{\frac{36}{5R}}=\frac{20}{27}$

22. A point source is kept at center of sphere. The intensity of light at point A is I , then intensity at point B is :



(1) $I/2$ (2) 2 I (3) I (4) $I/3$ m

Ans. **(3)**

Sol. Distance is same

So intensityis also same

$I=\frac{P}{4\pi R^2}$

23. Electric field due to half Ring at center is $100\ \mathrm{N/C}$. Find charge on Ring. Radius of Ring is 10 cm.

(1) $\frac{\pi}{9}\times10^{-9}\mathrm{C}$ (2) $\frac{\pi}{27}\times10^{-9}\mathrm{C}$ (3) $\frac{\pi}{18}\times10^{-9}\mathrm{C}$ (4) $\frac{\pi}{36}\times10^{-9}\mathrm{C}$

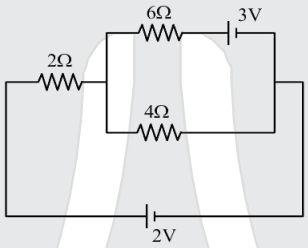
Ans. **(3)**

Sol. $E=\frac{2k\lambda}{r}$

$$\Rightarrow 100=\frac{2\times9\times10^{9}\times q}{\pi\times10\times10^{-2}\times10\times10^{-2}}$$

$$q=\frac{\pi}{18}\times10^{-9}\mathrm{C}$$

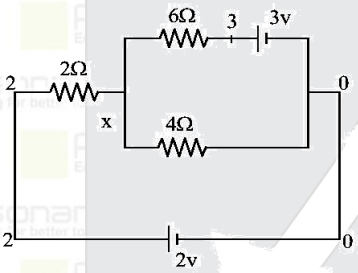
24. Find heat dissipate in 6Ω resistance in 100 seconds.



(1) 31 J (2) 35 J (3) 40 J (4) 28 J

Ans. **(1)**

Sol.



$$\frac{x-2}{2}+\frac{x-0}{4}+\frac{x-3}{6}=0$$

$$\frac{6x-12+3x+2x-6}{12}=0$$

$$11x-18=0\Rightarrow x=\frac{18}{11}\ \text{volt}$$

$$V_{6\Omega}=3-\frac{18}{11}=\frac{33-18}{11}=\frac{15}{11}$$

Heat in 6Ω in $100\mathrm{sec}=\left(\frac{v^2}{R}\right)\times100=\frac{\left(\frac{15}{11}\right)^2\times100}{6}=30.99=31\ \mathrm{J}$