MEMORY BASED QUESTIONS JEE–MAIN EXAMINATION – APRIL 2026

(HELD ON SUNDAY 05th APRIL 2026) **TIME : 3:00 PM TO 6:00 PM**

PHYSICS

TEST PAPER WITH SOLUTION

1. If x gm of water at 50°C cools to 0°C, the heat released is H. If (100 – x) gm of water at 50°C is completely vapourised, the heat required is also H. Find x.

(1) 8 gm (2) 20 gm

(3) 92.18 gm (4) 80 gm

Ans. (3)

Sol. x gm water

$50°C \longrightarrow 0°C$

$H = mS\Delta T$

$H = x(1)(50 - 0)$

$H = 50x$ ...(1)

(100 – x)

$50°C \longrightarrow 100°C$ (Steam)

$H = (100 - x)(1)(100 - 50) + (100 - x)(540)$ ...(2)

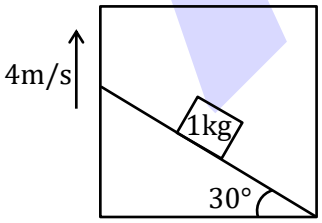
(1) = (2)

$50x = 5000 - 50x + 54000 - 540x$

$640x = 59000$

$x = 92.18$ gm

2. Friction is sufficient so that the block do not slide. Find work done by friction in 2 sec.

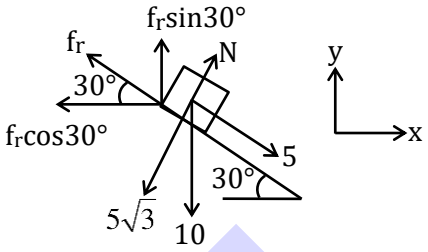


(1) 45 (2) 40

(3) 20 (4) 10

Ans. (3)

Sol.



$f_r = 5$

$(W_d)_f = (f_r)_y (\text{displacement})_y$

$(f_r)_y = f_r \sin 30° = \frac{5}{2}$

$(\text{displacement})_y = 4 \times 2$

$(W_d)_{f_r} = \frac{5}{2} \times (4 \times 2) = 20$

3. A wheel initially at rest is subjected to a uniform angular acceleration about its axis. In the first 2 sec it rotates through an angle θ_1 and in the next 2 sec it rotates an angle θ_2. Find the ratio of θ_2/θ_1.

(1) 5 (2) 2

(3) 4 (4) 3

Ans. (4)

Sol. In first 2 sec, $\theta_1 = \frac{1}{2}\alpha(2)^2$

$\theta_1 = 2\alpha$ ...(1)

In first 4 sec, $\theta' = \frac{1}{2}\alpha(4)^2 = 8\alpha$ ...(2)

In next 2 sec

$\theta_2 = 8\alpha - 2\alpha = 6\alpha$

Ratio of $\frac{\theta_2}{\theta_1} = \frac{6\alpha}{2\alpha} = 3$

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4. There is metallic ring of radius 20 cm placed in uniform unsteady field B = $(2t^2 + 2t + 3)$T perpendicular to plane of ring. If resistance of ring is 2Ω, find induced current at t = 2 sec. $[\pi = 22/7]$

(1) 0.63 Amp (2) 0.063 Amp

(3) 0.3 Amp (4) 6.3 Amp

Ans. (1)

Sol. $\varepsilon = \frac{d\phi}{dt} = A\frac{dB}{dt}$

$\varepsilon = \pi(20 \times 10^{-2})^2 \times (4t + 2)$

$\varepsilon = 4\pi \times 10^{-2}(4t + 2)$

at t = 2 sec

$\varepsilon = 0.4\ \pi$

$I = \frac{\varepsilon}{R} = \frac{0.4\pi}{2} = 0.2 \times \pi$

$= \frac{4.4}{7} = 0.628 \approx 0.63$ Amp

5. An electron travelling with velocity v in free space and when it enters a medium, its velocity is reduced by 20%. The de-Broglie wavelength of electron in the medium is $\alpha\lambda_0$, where λ_0 is de-Broglie wavelength in free space. The value of α is:-

(1) 1.25 (2) 1.5

(3) 0.8 (4) 0.125

Ans. (1)

Sol. $v_0 \rightarrow v_0 - 0.2\ v_0 = 0.8\ v_0$

$\lambda \propto \frac{1}{v}$

$\frac{\lambda_1}{\lambda_2} = \frac{v_2}{v_1} = 0.8$

$\lambda_2 = 1.25\ \lambda_0$

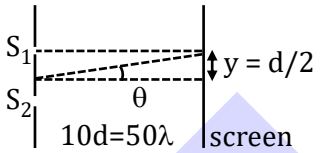
6. In YDSE setup slit separation is d = 5λ, where λ is wavelength of light and screen is placed at distance D = 10d. If maximum intensity is I_0, find intensity at a point directly in front of one of the slit.

(1) I_0 (2) $\frac{I_0}{3}$

(3) $\frac{I_0}{2}$ (4) $\frac{I_0}{6}$

Ans. (3)

Sol.



Path difference Δx = dsinθ

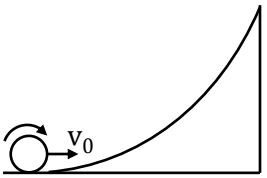
$= \frac{dy}{\sqrt{\left(\frac{d}{2}\right)^2 + (10d)^2}}$

$\Delta x = \frac{d^2}{d\sqrt{1+400}} \approx \frac{d}{20} = \frac{5\lambda}{20} = \frac{\lambda}{4}$

$\Delta\phi = \frac{2\pi}{\lambda}\Delta x = \frac{2\pi}{\lambda} \times \frac{\lambda}{4} = \frac{\pi}{2}$

$I = I_0 \cos^2\left(\frac{\Delta\phi}{2}\right) = I_0 \cos^2\left(\frac{\pi}{4}\right) = \frac{I_0}{2}$

7. If the rolling object reaches a maximum height $\frac{7V_0^2}{10g}$. What may be the object?



(1) Solid sphere
(2) Ring
(3) Disc
(4) Hollow sphere

Ans. (1)

Sol. Using energy conservation

$\frac{1}{2}mv_0^2 + \frac{1}{2}I_{COM} \times \left(\frac{v_0}{R}\right)^2 = mg \times \frac{7v_0^2}{10g}$

$I_{CM} \times \frac{1}{R^2} = \frac{2}{5}m$

$I_{CM} = \frac{2}{5}mR^2$

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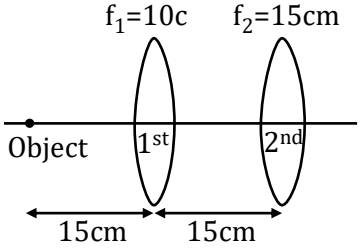
8. Find distance of final image from 2nd lens.



(1) 15 cm (2) ∞
(3) 7.5 cm (4) 30 cm

Ans. **(3)**

Sol. For 1st lens

$u = -15$ cm ; $f = +15$

$$\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$$

$$\frac{1}{v}-\frac{1}{-15}=\frac{1}{10}$$

$$\frac{1}{v}=\frac{1}{10}-\frac{1}{15}=\frac{3-2}{30}$$

$v = +30$

For 2nd lens

$u = +15$; $f = +15$

$$\frac{1}{v}-\frac{1}{15}=\frac{1}{15}$$

$$\frac{1}{v}=\frac{1}{15}+\frac{1}{15}=\frac{2}{15}$$

$$v=\frac{15}{2}=7.5\text{ cm}$$

Final image is 7.5 cm right of 2nd lens.

9. If across a resistance, voltage applied is (20 ± 0.2)V and current passing through it is (10 ± 0.1)A. Find maximum error in resistance :

(1) 0.04 (2) 0.05
(3) 0.06 (4) 0.07

Ans. **(1)**

Sol. $$\frac{\Delta R}{R}=\frac{\Delta V}{V}+\frac{\Delta I}{I}$$

$V = IR$

$20 = 10R$

$R = 2\Omega$

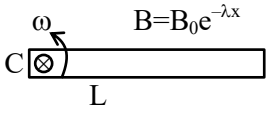
$$\frac{\Delta R}{2}=\frac{0.2}{20}+\frac{0.1}{10}$$

$$\frac{\Delta R}{2}=\frac{0.4}{20}$$

$$\Delta R=\frac{0.4}{10}=0.04$$

$\Delta R = 0.04$

10. Magnetic field at a distance x from point C as shown in the figure on rod is $B_0e^{-\lambda x}$, find induced emf between ends of metallic rod.



(1) $B_0\omega(1 - e^{-\lambda L}(1 + \lambda L))/\lambda^2$

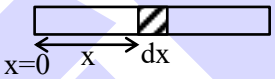
(2) $B_0\omega(L - e^{-\lambda L}(1 + \lambda L))/\lambda^2$

(3) $B_0\omega(L - e^{-2\lambda L}(1 + \lambda L))/\lambda^2$

(4) $B_0\omega(2L - e^{-\lambda L}(1 + \lambda L))/\lambda^2$

Ans. **(1)**

Sol. Small emf



$d\varepsilon = B(\omega x)dx$

$= B_0e^{-\lambda x}\,\omega x\,dx$

$= B_0\omega\int x.e^{-\lambda x}dx$

$$= B_0\omega\left(\frac{-e^{-\lambda x}}{\lambda^2}(\lambda x+1)\right)_0^L$$

$$= \frac{B_0\omega}{\lambda^2}\left(1-e^{-\lambda L}(1+\lambda L)\right)$$

11. In PN Junction, P side have high doping and N side is lightly doped then

(1) depletion layer has more region in P side

(2) depletion layer has more region in N side

(3) depletion layer has equal region in both side.

(4) There will be no depletion layer

Ans. **(2)**

Sol. Depletion layer always extends more in lightly doped semiconductor crystal.

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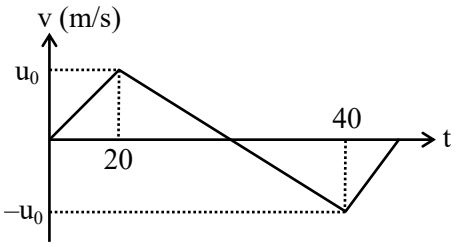
12. Find magnitude of acceleration of particle at t = 5 sec. If velocity time graph is given as shown in figure.



(1) $\frac{u_0}{20}$ (2) $\frac{u_0}{40}$

(3) $\frac{u_0}{10}$ (4) u_0

Ans. **(1)**

Sol. Slope of v-t graph gives instantaneous acceleration

$$a = \left(\frac{dv}{dt}\right)_{at\ 5sec}$$

$$a = \left(\frac{u_0}{20}\right)$$

13. In a RLC series circuit the value of R, L and C is given as R = 50Ω ; L = 1.6 H and C = 40μF.
Find the value inductive reactance (X_L) at resonance

(1) 50 Ω (2) 100 Ω

(3) 200 Ω (4) 400 Ω

Ans. **(3)**

Sol. At resonance

$$X_L = X_C$$

$$\omega L = \frac{1}{\omega C}$$

$$\Rightarrow \omega = \frac{1}{\sqrt{LC}}$$

$$X_L = L\omega$$

$$= L\frac{1}{\sqrt{LC}} = \sqrt{\frac{L}{C}} = \sqrt{\frac{1.6}{40\times10^{-6}}}$$

$$= \sqrt{\frac{16\times10^6}{40\times10}} = 200\ \Omega$$

14. A rod has volume V and young's modulus Y is subjected to stress τ. Find elastic energy stored in the rod.

(1) $\frac{1}{2}\frac{\tau^2 V}{Y}$ (2) $\frac{1}{2}\frac{\tau V}{Y}$

(3) $\frac{1}{2}\frac{\tau V}{Y^2}$ (4) $\frac{1}{2}\frac{\tau V^2}{Y}$

Ans. **(1)**

Sol. $U = \frac{1}{2} \times \text{Stress} \times \text{Strain} \times \text{Volume}$

$$Y = \frac{\text{Stress}}{\text{Strain}}$$

So, $U = \frac{1}{2} \times \frac{(\text{Stress})^2}{Y} \times \text{Volume}$

$$U = \frac{1}{2} \times \frac{\tau^2 V}{Y}$$

15. Match the column according to dimensions

(A)	$\sqrt{\frac{GM}{C}}$	(1)	$M^{-1}L^{2}T^{-3/2}$
(B)	$\sqrt{\frac{h^2}{GC}}$	(2)	$M^{0}L^{2}T^{-3/2}$
(C)	$\sqrt{GMC}$	(3)	$M^{3/2}L^{0}T^{0}$
(D)	$\sqrt{\frac{GC}{M}}$	(4)	$LT^{-1/2}$

(1) A-1, B-2, C-3, D-4 (2) A-4, B-3, C-1, D-2

(3) A-4, B-3, C-2, D-1 (4) A-1, B-3, C-4, D-2

Ans. (3)

Sol. (A) $\sqrt{\frac{GM}{C}} = \frac{(M^{-1}L^{3}T^{-2})^{1/2}(M)^{1/2}}{(LT^{-1})^{1/2}} = LT^{-1/2}$

(B) $\sqrt{\frac{h^2}{GC}} = \frac{ML^{2}T^{-1}}{(M^{-1}L^{3}T^{-2})^{1/2}(LT^{-1})^{1/2}} = M^{3/2}L^{0}T^{0}$

(C) $\sqrt{GMC} = (M^{-1}L^{3}T^{-2})^{1/2}(M^{1/2})(LT^{-1})^{1/2} = M^{0}L^{2}T^{-3/2}$

(D) $\sqrt{\frac{GC}{M}} = \frac{(M^{-1}L^{3}T^{-2})^{1/2}(LT^{-1})^{1/2}}{M^{1/2}} = M^{-1}L^{2}T^{-3/2}$

16. Escape velocity on earth is $V_e = \sqrt{2gR}$. A planet of half the radius of earth and density is equal to that of earth the escape speed from that planet shall be $\frac{V_0}{N}$ then N is :

(1) 4 (2) 6

(3) 2 (4) 8

Ans. (3)

Sol. $V_e = \sqrt{2gR} = \sqrt{\frac{2GM}{R}} = \sqrt{\frac{2G}{R} \times \rho \times \frac{4}{3}\pi R^3}$

$V_e \propto R$

$\frac{V_1}{V_2} = \frac{R_1}{R_2}$

$\frac{V_e}{V_2} = \frac{R}{R/2}$

$\left\{V_2 = \frac{V_e}{2}\right\}$

17. Match the column :

Column-I		Column-II	
(A)	$\sin^2 \omega t$	(P)	Non-periodic
(B)	$\cos(\omega t) + \cos(2\omega t)$	(Q)	Periodic but not SHM
(C)	$\sin^2(2\omega t)$	(R)	SHM with time period $\frac{\pi}{2\omega}$
(D)	$\cos(\pi + \omega t) + \cos(\omega t)$	(S)	SHM with time period $\frac{\pi}{\omega}$

(1) A-R, B-P, C-S, D-Q

(2) A-S, B-Q, C-R, D-P

(3) A-R, B-P, C-Q, D-S

(4) A-S, B-Q, C-P, D-R

Ans. (2)

Sol. (A) $\sin^2 \omega t \rightarrow$ SHM

$\omega t = \pi$

$t = \frac{\pi}{\omega}$ (time period)

(B) $\cos(\omega t) + \cos(2\omega t) \rightarrow$ not SHM

$\omega t = 2\pi$

$t = \frac{2\pi}{\omega}$ (time period)

(C) $\sin^2(2\omega t) \rightarrow$ SHM

$2\omega t = \pi$

$t = \frac{\pi}{2\omega}$ (time period)

(D) $\cos(\pi + \omega t) + \cos \omega t$

$= -\cos \omega t + \cos \omega t = 0$

Non-periodic

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18. 8 small liquid drops combined to form a bigger drop. Surface tension of liquid is T. Find change in surface potential energy.

(1) $32\pi r^2T$ (2) $16\pi r^2T$

(3) $8\pi r^2T$ (4) $6\pi r^2T$

Ans. **(2)**

Sol. $U_i = 8[T(4\pi r^2)]$

$U_i = 32\pi r^2T$ …(i)

$U_f = T[4\pi R^2]$

$\therefore$ volume is conserved

$$8\left(\frac{4}{3}\pi r^3\right) = \frac{4}{3}\pi R^3$$

$R = 2r$

$\therefore U_f = T[4\pi(2r)^2]$

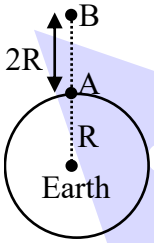
$U_f = 16\pi r^2T$ …(ii)

$|\Delta U| = U_i - U_f$

$= 32\pi r^2T - 16\pi r^2T$

$|\Delta U| = 16\pi r^2T$

19. Find ratio of potential energy of a body at point A to point B for the figure shown.

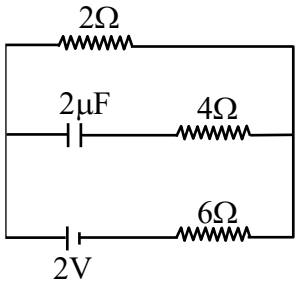


Ans. **(3)**

Sol. $U = -\frac{Gm_1m_2}{r}$

$$\frac{U_A}{U_B} \Rightarrow \frac{\frac{-GM_em}{R}}{-\frac{GM_em}{3R}} = \frac{3}{1}$$

20.



Find the voltage across capacitor in steady state.

(1) 1V (2) 0.5V

(3) 3/2V (4) 4V

Ans. **(2)**

Sol. At steady state current in capacitor branch is zero and voltage across capacitor is equal to voltage across 2Ω resistor.

$$V_C = V_{2\Omega} = \left(\frac{2}{2+6}\right)\times 2$$

$V_C = 0.5$ V

21. **Assertion:** EM radiation when falls on a surface then it exerts pressure.

Reason: Radiation has no rest mass.

(1) A & R both are correct and R is correct explanation of A

(2) A & R both are correct but R is not correct explanation of A

(3) A is correct but R is incorrect

(4) A is incorrect but R is correct

Ans. **(2)**

Sol. Theory

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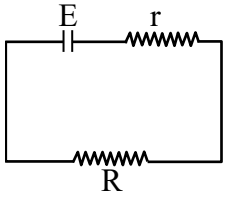
22. Figure shows a circuit consisting of cell of emf E & internal resistance r connected in series with external resistance R.

When R = 5Ω then i = 1A and

When R = 2Ω then i = 2A

Find r. (in ohm)



Ans. **(1)**

Sol. Ohm's law V = IR

$E = 1(5 + r)$ …(1)

$E = 2(2 + r)$ …(2)

$2(2 + r) = 1(5 + r)$

$4 + 2r = 5 + r$

$r = 1\Omega$

23. A thin convex lens and a thin concave lens are kept coaxially in contact. Choose the correct option.

(1) Focal length is changed when the positions of lens are interchanged

(2) behaves as a convex lens when (f of convex > f of concave)

(3) behaves as a concaves lens (f of concave > f of convex)

(4) behaves as a convex when (f of convex < f of concaves)

Ans. **(4)**

Sol. let f convex = $+f_L$

f concave = $-f_2$

$$\frac{1}{f_{eq}} = \frac{1}{f_1} - \frac{1}{f_2}$$

$$f_{eq} = \left(\frac{f_1 f_2}{f_2 - f_1}\right)$$

of $|f_2| > |f_1|$ then f_{eq} is is +ve act like convex

of $|f_2| < |f_1|$ then f_{eq} is –ve act like concave

24. Find binding energy of $^{12}_{6}C$. Given mass of proton $(m_p) = 1.0078$ u and mass of neutron $(m_n) = 1.0087$ u

(1) 92.19 MeV

(2) 80.20 MeV

(3) 85.19 MeV

(4) 100.19 MeV

Ans. **(1)**

Sol. B.E. = $(Zm_p + (A–Z)\, m_n – M_{Atom})c^2$

= $(6 \times 1.0078 + 6 \times 1.0087 – 12) \times 931.5$ MeV

= 92.19 MeV

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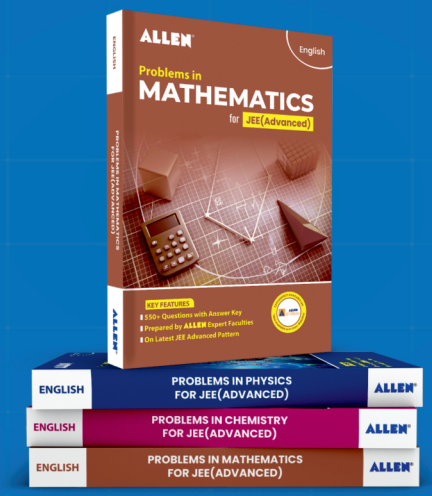

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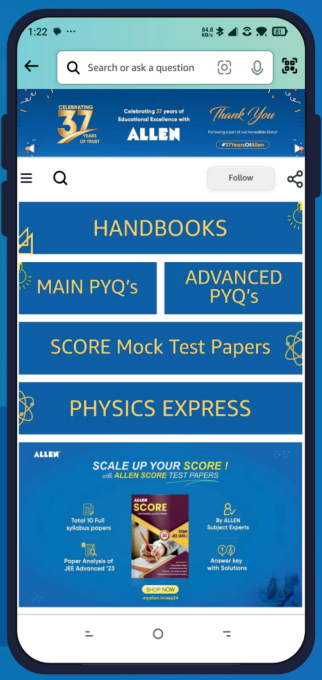

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