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JEE (MAIN) 2025

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-2

DATE & DAY: 28th January 2025 & Tuesday

PAPER-1

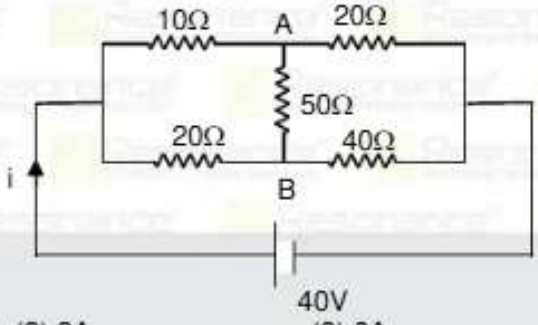
Duration: 3 Hrs.
Time: 03:00 PM – 06:00 PM

SUBJECT: PHYSICS

Selections in JEE (Advanced)/ IIT-JEE Since 2002	Selections in JEE (Main)/ AIEEE Since 2009	Selections in NEET (UG)/ AIPMT/AIIMS Since 2012
52395	257576	22494

PART : PHYSICS

1. In the given circuit. Find current from cell (i)

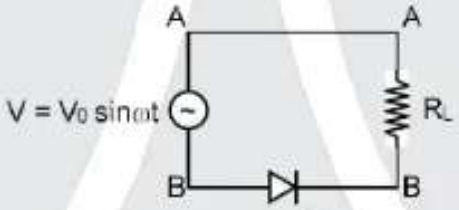


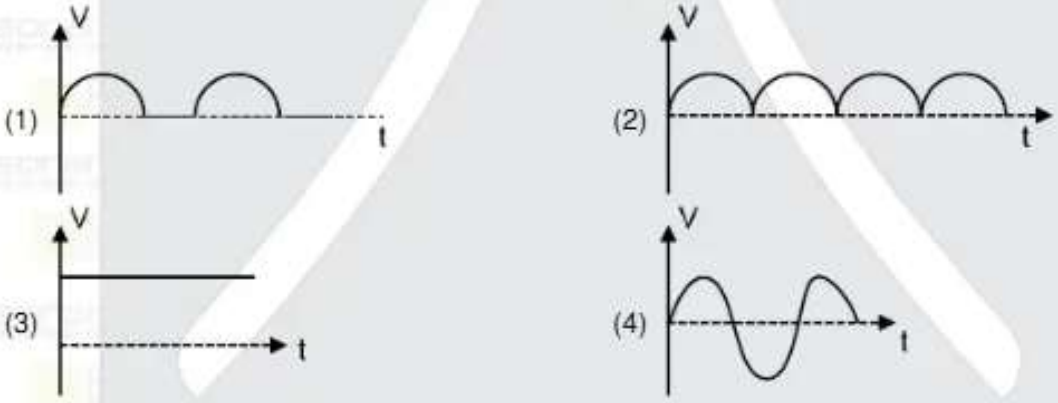
(1) 4A (2) 2A (3) 6A (4) 8A

Ans. **(2)**

Sol. Watch Video Solution

2. For given circuit, if input voltage of source is $V = V_0 \sin\omega t$ then output voltage (v) across load resistance can be represented by





Ans. **(1)**

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3. If equation of magnetic field is given by $\vec{B} = B_0\left(\frac{\sqrt{3}}{2}\hat{i} + \frac{\hat{j}}{2}\right)\sin(\omega t - kz)$ then the electric field equation can be represented by

(1) $\vec{E} = \left[\frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j}\right]B_0 c\sin(\omega t - kz)$

(2) $\vec{E} = \left[-\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j}\right]B_0 c\sin(\omega t - kz)$

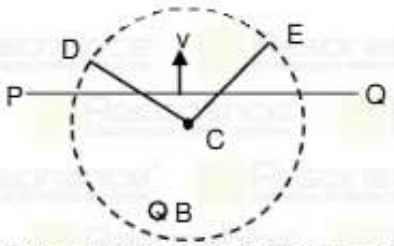
(3) $\vec{E} = \left[\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j}\right]B_0 c\sin(\omega t + kz)$

(4) $\vec{E} = \left[\frac{1}{2}\hat{i} - \frac{\sqrt{3}}{2}\hat{j}\right]B_0 c\sin(\omega t - kz)$

Ans. **(4)**

Sol. Watch Video Solution

4.



Constant Magnetic field is in cylindrical region is as shown in figure. CDE is conducting fix part. If the rod PQ is moving with constant velocity from C then EMF induced with time t is e. If $e \propto t^n$ then value of n is ....

(1) 1 (2) 2 (3) 3 (4) 4

Ans. **(1)**

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5. A planet has mass 8 times the mass of earth and radius 2 times that of earth. If escape speed on earth is 11.2 km/s then find the value of escape speed on the planet.

(1) 2.8 km/sec (2) 5.6 km/sec (3) 11.2 km/sec (4) 22.4 km/sec

Ans. **(4)**

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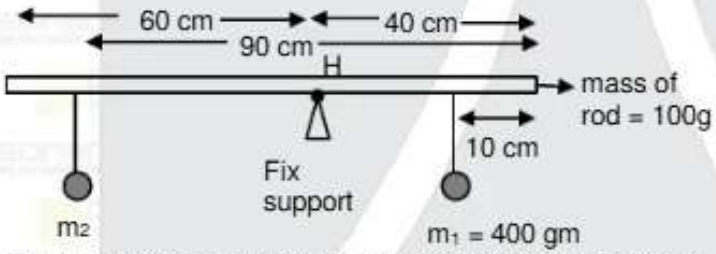
6.



To remain rod in equilibrium, what should be the mass m_2

(1) 210 gm (2) 420 gm (3) 150 gm (4) 350 gm

Ans. **(1)**

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7. For a concave mirror distance between object and image is 20 cm and transverse magnification m = – 3. Find radius of curvature of mirror.

(1) 12 cm (2) 15 cm (3) 25 cm (4) 9 cm

Ans. **(2)**

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8. Bohr model is applicable for single electron atom. Dependence of frequency of rotation of electron in n^{th} principal quantum number is proportional to?

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

Ans. **(2)**

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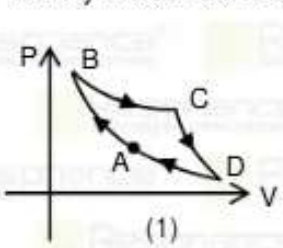
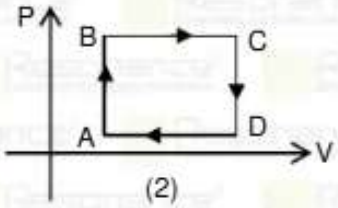
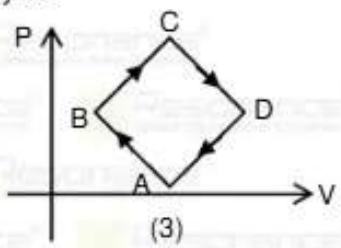
9. Identify the correct relation between following graphs in ΔU in complete cycle



(1)



(2)



(3)

(1) $\Delta U_1 > \Delta U_2 > \Delta U_3$ (2) $\Delta U_1 < \Delta U_2 < \Delta U_3$

(3) $\Delta U_1 = \Delta U_2 = \Delta U_3$ (4) $\Delta U_1 > \Delta U_2 < \Delta U_3$

Ans. **(3)**

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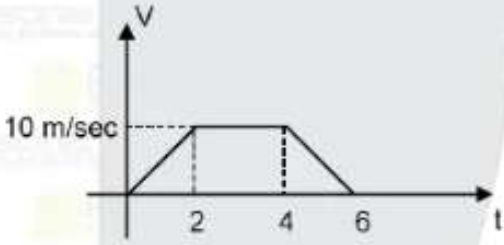
10.



If a particle is moving along x-axis with velocity varying as shown. Find total distance travelled by particle up to 4 sec.

(1) 20 m (2) 30 m (3) 40 m (4) 50 m

Ans. **(2)**

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11. A balloon of mass m is travelling upward with constant acceleration is a. Now some mass Q is thrown from the balloon, so that it will start to travel with constant acceleration 3a upward. Find that mass Q :

(1) $\frac{ma}{g+3a}$ (2) $\frac{2mg}{g+a}$ (3) $\frac{2ma}{g+3a}$ (4) $\frac{mg}{g+3a}$

Ans. **(3)**

Sol. **Watch Video Solution**

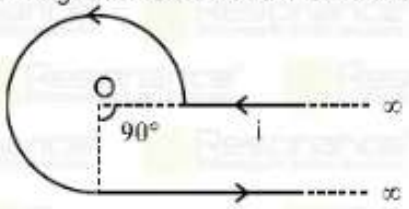
12. A cubical block of mass 400 gm and side 10 cm is floating in water. The volume of cube above water surface will be :

(1) 1400 cm^3 (2) 600 cm^3 (3) 400 cm^3 (4) 800 cm^3

Ans. **(2)**

Sol. **Watch Video Solution**

13. For the given arrangement find magnetic field $\vec{B}$ at the centre O ?



(1) $\frac{\mu_0 I}{4\pi a}\left[\frac{3\pi}{2}+1\right]\hat{k}$ (2) $-\frac{\mu_0 I}{4\pi a}\left[\frac{3\pi}{2}+1\right]\hat{k}$ (3) $\frac{\mu_0 I}{\pi a}\left[\frac{3\pi}{2}-1\right]\hat{k}$ (4) $-\frac{\mu_0 I}{4\pi a}\left[\frac{3\pi}{2}-1\right]\hat{k}$

Ans. **(1)**

14. Which of the following phenomena can not be explained by wave nature

(1) diffraction (2) Refraction (3) Reflection (4) Compton effect

Ans. **(4)**

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15. A force $\vec{F} = 2\hat{i} + 3\hat{j}$ is acting on a block of mass 4 kg at rest from the point (3, 4) to (6, 10) for 4 second.

Find the ratio of $\frac{\text{Power(average)}}{\text{Power(Instataneous)}}$

(1) 3 : 13 (2) 6 : 13 (3) 13 : 6 (4) 13 : 3

Ans. **(2)**

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16. Find the energy density inside capacitor whose plate separation is 1 μm & potential difference across capacitor 20 Volt & Capacitance is 1μF.

(1) 1.8×10^2 (2) 2×10^2 (3) 2×10^{-2} (4) 1.8×10^3

Ans. **(4)**

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17. A Cube of side 10 cm having balk modulus of 1.4×10^{11} Pa is placed in atmosphere. Now it is subjected to extra pressure of 7×10^6 Pa then magnitude of change in volume of cube is?

(1) 0.03 ml (2) 0.3 ml (3) 0.05 ml (4) 0.2 ml

Ans. **(3)**

Sol. Watch Video Solution

18. The ratio of density of two gases at same pressure is 4 : 25 then ratio of rms speed of gases will be

(1) 5 : 2 (2) 2 : 5 (3) 4 : 25 (4) 25 : 4

Ans. **(1)**

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19. If a dipole whose dipole moment $\vec{P} = 6 \times 10^{-6}$ C-m is placed in a uniform electric field 6×10^6 V/m. If it moved from stable equilibrium position to unstable equilibrium position. then the change in potential energy of the dipole _____ J.

(1) 72 J (2) 36 J (3) 18 J (4) 9 J

Ans. **(1)**

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20. Dimension of

(A) Angular impulse	(P) $ML^3T^{-3}A^{-2}$
(B) Electromotive force	(Q) $M^0L^2T^{-2}$
(C) Electrical resistivity	(R) $M^1L^2T^{-1}$
(D) Latent Heat	(S) $M^1L^2T^{-3}A^{-1}$

(1) A $\rightarrow$ R, B $\rightarrow$ S, C $\rightarrow$ P, D $\rightarrow$ Q

(2) A $\rightarrow$ R, B $\rightarrow$ P, C $\rightarrow$ S, D $\rightarrow$ Q

(3) A $\rightarrow$ R, B $\rightarrow$ S, C $\rightarrow$ Q, D $\rightarrow$ P

(4) A $\rightarrow$ S, B $\rightarrow$ R, C $\rightarrow$ P, D $\rightarrow$ Q

Ans. **(1)**

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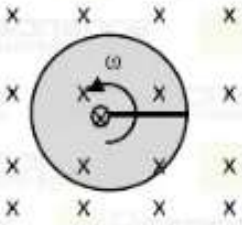
21. Translational kinetic energy of 50 gm CO_2 at 17°C

(1) 4120 J (2) 4000 J (3) 4320 J (4) 3860 J

Ans. **(1)**

22. A disk of radius 20 cm is rotating about its axis in a constant magnetic field B = 0.4 T, perpendicular to its plane with angular velocity $\omega = 10\pi$ rad/sec. What will be potential difference between the, centre and periphery.

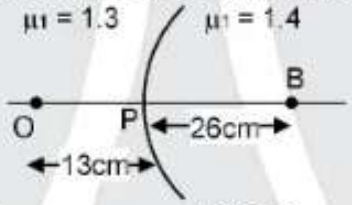


(1) 12V (2) 0.25 V (3) 1.25 V (4) 5V

Ans. **(2)**

Sol. **Watch Video Solution**

23. Two immiscible liquids with refractive index $\mu_1 = 1.3$ and $\mu_2 = 1.4$ form a convex interface as shown. An object is placed at a distance of 13 cm from the interface and its image is formed at a distance 26 cm as shown in diagram. Find the radius of curvature of the interface.



(1) 0.55 cm (2) 0.65 cm (3) 0.13 cm (4) 0.85 cma

Ans. **(2)**

Sol. **Watch Video Solution**