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# JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-2

**DATE & DAY:** 04<sup>th</sup> April 2026 & Saturday

**PAPER-1**

**Duration:** 3 Hrs.

**Time:** 03:00 – 6:00 IST

**SUBJECT: PHYSICS**

Selections in JEE (Advanced)/  
IIT-JEE Since 2002

**52979**

Classroom: 35901 | Distance: 17078

Selections in JEE (Main)/  
AIEEE Since 2009

**262693**

Classroom: 194471 | Distance: 68222

Selections in NEET (UG)/  
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**22733**

Classroom: 15409 | Distance: 7324

**Admission Open for 2026-27**

**Target:** JEE (Advanced) | JEE (Main) | NEET (UG) | PCCP (Class V to X)

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## PART : PHYSICS

1. A Zener diode has voltage rating of 10 volts and maximum power drop across Zener diode is 0.5 watt. What resistance (in Ohm) should be connected in series with Zener diode so that it can be operated safely by a battery of 25 volts?

(1) 300Ω                      (2) 200Ω                      (3) 30Ω                      (4) 20Ω

**Ans. (1)**

**Sol.** Maximum current from diode

$$i = \frac{P}{V} = \frac{0.5}{10} = 0.05 \text{ A}$$

Now let resistance is R

$$V_B = i(R + R_{\text{diode}})$$

$$25 = 0.05 \times R + 10$$

$$R = \frac{15}{0.05} = 300\Omega$$

2. Material of  $\mu_r = 400$  is present inside a solenoid where magnetic field is found to be 1 T. If magnetic intensity here is  $\alpha \times 10^5$  SI units, find  $\alpha$ . ( $\mu_0 = 4\pi \times 10^{-7}$  SI units)

(1)  $\frac{1}{4\pi}$                       (2)  $\frac{1}{16\pi}$                       (3)  $\frac{1}{2\pi}$                       (4)  $\frac{1}{\pi}$

**Ans. (2)**

**Sol.**  $H = \frac{B}{\mu} = \frac{B}{\mu_0 \mu_r} = \frac{1}{400 \times 4\pi \times 10^{-7}}$   
 $H = \frac{1}{16\pi} \times 10^5$

3. A solenoid of radius 2 cm and with 125 turns is kept in a uniform magnetic field of 0.4 T carries a current of 1 A. The axis of solenoid makes angle  $30^\circ$  with the field. The torque acting on the solenoid will be :

(1)  $\pi \times 10^{-6}$  N – m                      (2)  $\pi \times 10^{-2}$  N – m                      (3)  $2\pi \times 10^{-6}$  N – m                      (4)  $2\pi \times 10^{-2}$  N – m

**Ans. (2)**

**Sol.** Magnetic moment of solenoid =  $iAN$

$$= 1 \times \pi \times \left(\frac{2}{100}\right)^2 \times 125$$

$$\therefore \tau = |\vec{M} \times \vec{B}| = 125 \times 4\pi \times 10^{-4} \times 0.4 \times \sin 30^\circ$$

$$= 100\pi \times 10^{-4} \text{ N – m.}$$

4. **Assertion :** For a diode in reverse biased, current is independent of applied voltage before breakdown and it increases drastically just after breakdown.

**Reason :** Before breakdown only majority charge carriers flow.

(1) A & R both correct and R explain the A.

(2) A&R both correct and R does not explain A.

(3) A is true but R is false.

(4) A is false but R is true

**Ans. (3)**

**Sol.** Theoretical

5. Why does only few  $\alpha$ -particles rebound from gold nucleus in Rutherford experiment

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S1 → Size of gold nucleus is very less than gold atom

S2 → Impact parameter of  $\alpha$  particles is very less.

S3 → Nuclear charge of  $\text{He}^{+2}$  particles is very less as compared to gold

S4 → Very few  $\alpha$  particles undergo head on collision.

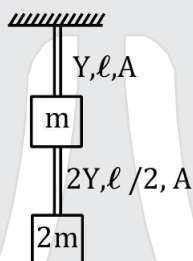
Then correct statement are

- (1) S1 and S2      (2) S1, S2 and S3      (3) S1, S2 and S4      (4) S1 and S3

Ans. (3)

Sol. Theoretical

6. Two rods and two blocks are connected as shown in figure. Find out ratio of extension in the rods :-



(1) 6: 1

(2) 2: 1

(3) 3: 1

(4) 4: 1

Ans. (1)

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

$$\Delta \ell_1 = \frac{3mg\ell}{YA}$$

$$\Delta \ell_2 = \frac{2mg(\ell/2)}{2YA} = \frac{mg\ell}{2YA}$$

$$\frac{\Delta \ell_1}{\Delta \ell_2} = 6$$

7. A dipole is kept in an electric field  $\vec{E}_1 = E_0\hat{i}$ . It oscillates with some frequency. New electric field  $\vec{E}_2 = 2E_0\hat{j} + 2E_0\hat{k}$  is superimposed over existing electric field. Now dipole is kept in direction of  $E_{\text{net}}$  and is displaced slightly, it oscillates with some other frequency. Find percentage change in frequency.

(1) 100%

(2) 200%

(3) 50%

(4) 73%

Ans. (4)

Sol. Initially for small oscillation

$$\vec{\tau} = PE \sin \theta \approx PE\theta$$

$$\alpha = \frac{PE}{I}\theta$$

$$\omega^2 = \frac{PE}{I}$$

$$\omega = \sqrt{\frac{PE}{I}}$$

$$\text{Finally, } \vec{E}_{\text{net}} = \vec{E}_1 + \vec{E}_2 = E_0\hat{i} + 2E_0\hat{j} + 2E_0\hat{k}$$

$$E_{\text{net}} = \sqrt{E_0^2 + 4E_0^2 + 4E_0^2} = 3E_0$$

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$$\omega' = \sqrt{\frac{P3E_0}{I}} = 1.73 \sqrt{\frac{PE_0}{I}}$$

% change in  $\omega = 73\%$

8. Match the given quantities according to their dimension :-

|                                |                          |
|--------------------------------|--------------------------|
| (A) $\phi$ (Work function)     | (P) $T^{-1}$             |
| (B) $h$ (Planck's constant)    | (Q) $ML^2 T^{-3} A^{-1}$ |
| (C) $V_s$ (Stopping potential) | (R) $ML^2 T^{-1}$        |
| (D) $f$ (frequency)            | (S) $ML^2 T^{-2}$        |

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

Ans. (3)

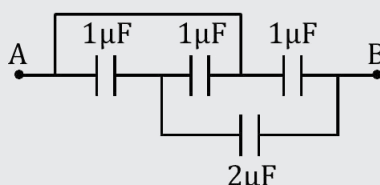
Sol.  $[\phi] = ML^2 T^{-2}$

$$[h] = \left[ \frac{E}{f} \right] = ML^2 T^{-2} T = ML^2 T^{-1}$$

$$[V_s] = \left[ \frac{E}{-q} \right] = \frac{ML^2 T^{-2}}{AT} = ML^2 T^{-3} A^{-1}$$

$$[f] = T^{-1}$$

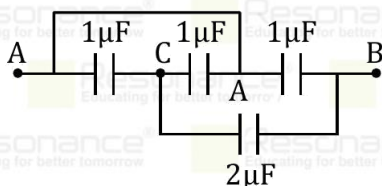
9. For given capacitor circuit, find out equivalent capacitance between A and B .



- (1)  $4\mu F$                       (2)  $2\mu F$                       (3)  $1\mu F$                       (4)  $0.5\mu F$

Ans. (2)

Sol.



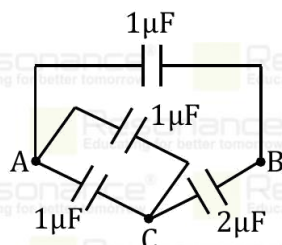
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$$C_{AB} = 2\mu F$$

10. A force  $\vec{F} = (5\hat{i} + 2\hat{j})N$  is acting for 2 sec on an object of mass 0.1 kg, which is initially at rest at origin. Find final position.

- (1)  $50\hat{i} + 20\hat{j}$       (2)  $100\hat{i} + 20\hat{j}$       (3)  $50\hat{i} + 40\hat{j}$       (4)  $100\hat{i} + 40\hat{j}$

Ans. (4)

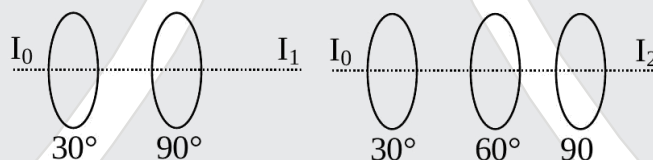
Sol.  $\vec{F} = 5\hat{i} + 2\hat{j}$

$$\vec{a} = \frac{\vec{F}}{m} = \frac{5}{0.1}\hat{i} + \frac{2}{0.1}\hat{j} = 50\hat{i} + 20\hat{j}$$

$$\vec{S} = \frac{1}{2}\vec{a}t^2 = \frac{1}{2} \times (50\hat{i} + 20\hat{j})2^2$$

$$\vec{S} = 100\hat{i} + 40\hat{j}$$

11. Two setup of polarizers are used to polarize natural light as shown. Find value of ratio of intensities  $\frac{I_1}{I_2}$ . Angle of axes is shown in figure from a fixed axis.



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

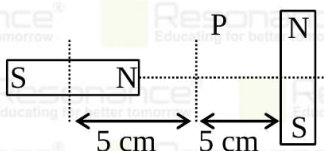
Ans. (1)

Sol.  $I_1 = \frac{I_0}{2} \cos^2 60^\circ = \frac{I_0}{8}$

$$I_2 = \frac{I_0}{2} \cos^2 30^\circ \cos^2 30^\circ = \frac{9I_0}{32}$$

$$\frac{I_1}{I_2} = \frac{4}{9}$$

12. Point P at  $r = 5$  cm distance from centers of two bar magnetic each of magnetic moment  $3\sqrt{5}$  A – m. Magnetic field at P is ?



- (1) 1.5 mT      (2) 12 mT      (3) 2.5 mT      (4) 4.5 mT

Ans. (2)

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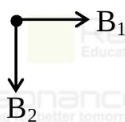
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Sol.  $B_{net} = \sqrt{B_1^2 + B_2^2} = \frac{\mu_0 M}{4\pi(r)^3} \sqrt{5}$



$$= 10^{-7} \times 3\sqrt{5} \times \sqrt{5} \times \frac{8}{10^{-3}}$$

$$= 120 \times 10^{-4} = 12\text{mT}$$

13.  $\vec{B} = B_0 \sin(\omega t - kx)\hat{j}$  is magnetic field of EM wave then its electric field is:

- (1)  $-E_0 \sin(\omega t - kx)\hat{k}$  (2)  $+E_0 \sin(\omega t - kx)\hat{i}$   
 (3)  $-E_0 \sin(\omega t - kx)\hat{i}$  (4)  $+E_0 \sin(\omega t - kx)\hat{k}$

Ans. (1)

Sol.  $\hat{E} = \hat{B} \times \hat{C}$   
 $= \hat{j} \times \hat{i} = -\hat{k}$   
 $\Rightarrow E = -E_0 \sin(\omega t - kx)\hat{k}$

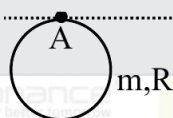
14. Electron and proton are accelerated with same potential to achieve de-Broglie wavelength of  $\lambda_1$  and  $\lambda_2$  ( $m_p = 1849m_e$ ) then  $\frac{\lambda_1}{\lambda_2} = ?$

- (1) 37 (2) 43 (3)  $\frac{1}{41}$  (4)  $\frac{1}{48}$

Ans. (2)

Sol.  $\lambda = \frac{h}{\sqrt{2mq\Delta v}}$   
 $\lambda \propto \frac{1}{\sqrt{m}}$   
 $\frac{\lambda_e}{\lambda_p} = \sqrt{\frac{m_p}{m_e}} = \sqrt{1849} = 43$

15. Figure show a disc of mass 'm' & radius R hinged at point 'A' and free to oscillate about the axis. Find the time period for small oscillation of the disc



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

Ans. (3)

Sol.  $I_{disc} = \frac{mR^2}{4} + mR^2 = \frac{5mR^2}{4}$   
 $\therefore$  For small displacement  
 $\tau = -mgR\theta$   
 $\alpha = -\frac{mgR}{\frac{5mR^2}{4}} \theta$

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$$\therefore \omega = \sqrt{\frac{4g}{5R}}$$

$$\therefore T = 2\pi \sqrt{\frac{5R}{4g}}$$

16. At what height does gravitational acceleration becomes  $\frac{1}{9}$ th of gravity at the surface of a planet, if radius of the planet is R ?

- (1)  $\frac{4R}{3}$                       (2)  $2R$                       (3)  $2\sqrt{2}R$                       (4)  $2\sqrt{3}R$

Ans. (2)

Sol.  $g_h = \frac{g_s}{\left(1 + \frac{h}{R}\right)^2}$   
 $\frac{g_s}{9} = \frac{g_s}{\left(1 + \frac{h}{R}\right)^2}$   
 $1 + \frac{h}{R} = 3$   
 $h = 2R$

17. A particle is projected from ground whose x, y – co – ordinates varies with time according to equations  $x = 24t, y = 43.6t - 4.9t^2$ . Find initial angle  $\theta$  made by  $\vec{v}$  with x -axis.

- (1)  $\cot^{-1}(1.82)$                       (2)  $\tan^{-1}(1.82)$                       (3)  $\tan^{-1}(2.82)$                       (4)  $\tan^{-1}(3.4)$

Ans. (2)

Sol.  $v_x \Rightarrow \frac{dx}{dt} = 24$   
 $v_y = \frac{dy}{dt} = 43.6 - 9.8t$   
 $\tan \theta = \frac{v_y}{v_x} = \frac{43.6 - 9.8t}{24}$   
 at  $t = 0$  {Initially}  
 $\tan \theta \Rightarrow \frac{43.6}{24} = 1.82$   
 or  $\theta = \tan^{-1}(1.82)$

18. A rod of length L is heated from temp  $T_1$  to  $T_2$  Let  $T_2 - T_1 = \Delta T$  and expansion of rod =  $\Delta L_1$  The rod is further heated from  $T_2$  to  $T_3$  such that  $T_1 + T_3 = 2 T_2$ . Find expansion of rod  $\Delta L_2$

- (1)  $\Delta L_2 = \Delta L_1(1 + \alpha \Delta T)$                       (2)  $\Delta L_2 = \Delta L_1(1 + 2\alpha \Delta T)$   
 (3)  $\Delta L_2 = \Delta L_1(1 + \alpha^2 \Delta T^2)$                       (4)  $\Delta L_2 = \Delta L_1(1 + 2\alpha^2 \Delta T^2)$

Ans. (1)

Sol.  $T_3 - T_2 = (2 T_2 - T_1) - T_2 = T_2 - T_1$   
 at temp  $T_2$   
 $L_1 = L(1 + \alpha(T_2 - T_1)) = L + L\alpha\Delta T$  ..... (1)  
 $L_1 - L = \alpha\Delta T \Rightarrow \Delta L_1 = \alpha\Delta T$   
 at temp  $T_3$   
 $L_2 = L_1(1 + \alpha(T_3 - T_2)) = L_1 + L_1\alpha\Delta T$  .....(2)  
 (2) - (1)  
 $L_2 - L_1 = (L_1 - L) + (L_1 - L)\alpha\Delta T$   
 $\Delta L_2 = \Delta L_1 + \Delta L_1\alpha\Delta T$

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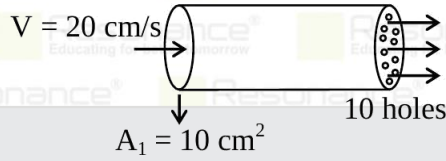
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$$= \Delta L_1(1 + \alpha \Delta T)$$

19. Figure shows a pipe with cross-section area  $10 \text{ cm}^2$ . Water flows from one end with velocity  $20 \text{ cm/s}$ . Other end of the pipe is closed and consists of 10 holes each of area  $30 \text{ mm}^2$ . Find velocity of water coming out from each hole.



- (1) 66 cm/s                      (2) 0.66 cm/s                      (3) 6.6 cm/s                      (4) 66 mm/s

Ans. (1)

Sol. Continuity equation

$$A_1 V_1 = A_2 V_2$$

$$10 \times 10^{-4} \times 20 \times 10^{-2} = 10 \times 30 \times 10^{-6} \times V_2$$

$$v_2 = \frac{2}{3} \text{ m/s}$$

$$\Rightarrow 0.66 \text{ m/s} \Rightarrow 66 \text{ cm/s}$$

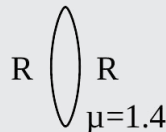
20. A toy gun fires bullets in every possible direction. It is found that bullet lands at a maximum horizontal distance of  $6.4 \text{ m}$  from gun. Find speed of projection ( $g = \frac{10 \text{ m}}{\text{s}^2}$ )

Ans. (8)

Sol.  $R_{\text{max}} = \frac{v^2}{g} = 6.4$

$$v = \sqrt{64} = 8 \text{ m/s}$$

21. As shown figure for a biconvex lens focal length is  $f$  and both radius of curvatures are  $R$ . Find value of  $f/R$



- (1) 1.25                      (2) 1.5                      (3) 2                      (4) 2.5

Ans. (1)

Sol.  $\frac{1}{f} = (1.4 - 1) \left( \frac{1}{R} - \frac{1}{-R} \right)$

$$\frac{1}{f} = \frac{0.8}{R}$$

$$\frac{f}{R} = 1.25$$

22. Assertion (A) : Free charge cannot exist inside conductor.  
Reason (R): If a free charge is kept between the plates of a capacitor, then it will experience force and it will drift.  
(1) A & R both correct and R explain the A.  
(2) A & R both correct and R does not explain A.

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(3) A is true but R is false.

(4) A is false but R is true

Ans. (2)

Sol. Theoretical Questions Both statements are correct but Reason does not explain the Assertion.

23. Two cars A & B are moving on a road with speed 100 km/hr and 80 km/hr. A stone is thrown from car B with speed  $V$  km/hr relative to it. Stone hit the car A with speed 5 m/s with respect to car A (ignore gravity). The value of  $V$  is :- [all the given velocities are in same direction]

(1) 40 km/hr (2) 38 km/hr (3) 38 m/s (4) 40 m/s

Ans. (2)

Sol.



$$V = \vec{V}_{SB}$$

$$V = \vec{V}_S - \vec{V}_B$$

$$V_B + V = \vec{V}_S$$

$$\vec{V}_S = V + 80$$

$$\vec{V}_{SA} = 5 \text{ m/s} = 18 \text{ km/hr}$$

$$\vec{V}_S - \vec{V}_A = \vec{V}_{SA}$$

$$V + 80 - 100 = 18 \text{ km/hr}$$

$$V - 20 = 18$$

$$V = 38 \text{ km/hr}$$

24. In a YDSE experiment a sheet of thickness  $t$  and  $\mu = 1.56$  introduced at a slit. The central maxima shift to position of 7<sup>th</sup> maxima. Wavelength of light is 480 nm . If  $t = x\mu\text{m}$  find the value of  $x$  .

Ans. (6)

Sol.  $\Delta y = (\mu - 1)t \frac{D}{d} = 7 \frac{\lambda D}{d}$

$$(\mu - 1)t = 7\lambda$$

$$(1.56 - 1)t = 7 \times 480 \times 10^{-9}$$

$$t = 6\mu\text{m}$$

25. **Statement-1** : Two gases  $\text{H}_2$  and  $\text{O}_2$  are having same average kinetic energy, then they have same temperature.

**Statement-2** :  $\text{H}_2$  and  $\text{O}_2$  will have same  $V_{\text{rms}}$  at same temperature.

(1) Statement-1 & Statement-2 both are correct and Statement-2 is correct explanation of Statement-1.

(2) Both Statement-1 & Statement-2 correct but Statement-2 is not correct explanation of Statement-1.

(3) Statement-1 true and Statement-2 is false.

(4) Both are false.

Ans. (3)

Sol.  $V_{\text{rms}} = \sqrt{\frac{3RT}{M}}$

$$KE = \frac{3}{2} nRT$$

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