JEE Main 2026 April 2 Shift 1 Physics

Question Paper

Conducted by National Testing Agency (NTA)

General Instructions

(i) **Duration:** The total duration of the examination is 3 hours (180 minutes).

(ii) **Total Marks:** The complete paper carries a maximum of 300 marks.

(iii) **Structure:** The paper has 3 part and each consists of two sections:

- **Section A:** 20 Multiple Choice Questions (MCQs).
- **Section B:** 5 Numerical Value Type Questions.

(iv) **Compulsory Questions:** All 25 questions are compulsory.

(v) Each question has four options. Only **one** option is correct.

(vi) **Right Answer:** +4 marks.

(vii) **Incorrect Answer:** −1 mark (Negative marking).

(viii) **Unanswered/Marked for Review:** 0 marks.

Physics

1. The dimensional formula of $\frac{1}{2}\varepsilon_0 E^2$ (ε_0 = permittivity of vacuum and E = electric field) is $M^a L^b T^c$. The value of $2a - b + c$ is:

(A) 0

(B) 1

(C) −1

(D) 2

2. The diameter of a wire measured by a screw gauge of least count 0.001 cm is 0.08 cm. The length measured by a scale of least count 0.1 cm is 150 cm. When a weight of 100 N is applied to the wire, the extension in length is 0.5 cm measured by a micrometer of least count 0.001 cm. The error in the measured Young's modulus is $\alpha \times 10^9$ N/m^2. The value of α is:

(A) 1.3

(B) 1.65

(C) 0.13

(D) 0.25

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3. The velocity of a particle is given as

$$\vec{v} = -x\hat{i} + 2y\hat{j} - z\hat{k} \text{ m/s.}$$

The magnitude of acceleration at the point $(1, 2, 4)$ is _____ m/s^2.

(A) $\sqrt{6}$

(B) 9

(C) $\sqrt{33}$

(D) 0

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4. The position of an object having mass 0.1 kg as a function of time t is given as

$$\vec{r} = (10t^2\hat{i} + 5t^3\hat{j}) \text{ m.}$$

At $t = 1$ s, which of the following statements are correct?

A. Linear momentum $\vec{p} = (2\hat{i} + 1.5\hat{j})$ kg m/s.

B. Force acting on the object $\vec{F} = (2\hat{i} + 3\hat{j})$ N.

C. Angular momentum about origin $\vec{L} = 15\hat{k}$ J s.

D. Torque about origin $\vec{\tau} = 20\hat{k}$ N m.

Choose the correct answer.

(A) A, B and C only

(B) B, C and D only

(C) A, C and D only

(D) A, B and D only

5. A planet P_1 is moving around a star of mass $2M$ in an orbit of radius R. Another planet P_2 is moving around another star of mass $4M$ in an orbit of radius $2R$. The ratio of time periods of revolution of P_2 and P_1 is:

(A) $\frac{1}{2}$

(B) 2

(C) 4

(D) $\frac{1}{4}$

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6. A particle is rotating in a circular path and at any instant its motion can be described as

$$\theta = \frac{5t^4}{40} - \frac{t^3}{3}.$$

The angular acceleration of the particle after 10 seconds is ____ rad/s^2.

(A) 150

(B) 120

(C) 130

(D) 170

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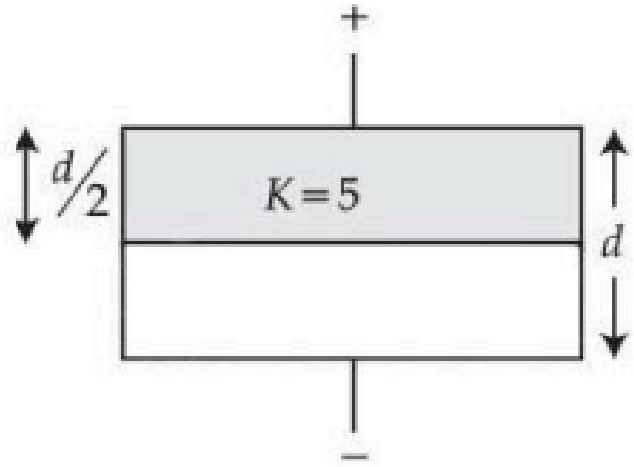
7. A parallel plate air capacitor has a capacitance C. When it is half filled as shown in the figure with a dielectric constant $K = 5$, the percentage increase in the capacitance is:



(A) 33.34

(B) 66.67

(C) 200

(D) 400

8. Heat is supplied to a diatomic gas at constant pressure. Then the ratio of $\Delta Q : \Delta U : \Delta W$ is:

(A) 2 : 3 : 5

(B) 5 : 3 : 2

(C) 2 : 5 : 7

(D) 7 : 5 : 2

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9. Two charged conducting spheres S_1 and S_2 of radii 8 cm and 18 cm are connected to each other by a wire. After equilibrium is established, the ratio of electric fields on S_1 and S_2 spheres are E_{S_1} and E_{S_2} respectively. The value of $\frac{E_{S_1}}{E_{S_2}}$ is:

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

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

(C) $\frac{4}{9}$

(D) $\frac{9}{4}$

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10. The equation of a plane progressive wave is given by

$$y = 5\cos\pi\left(200t - \frac{x}{150}\right)$$

where x and y are in cm and t is in seconds. The velocity of the wave is ____ m/s.

(A) 120

(B) 150

(C) 200

(D) 300

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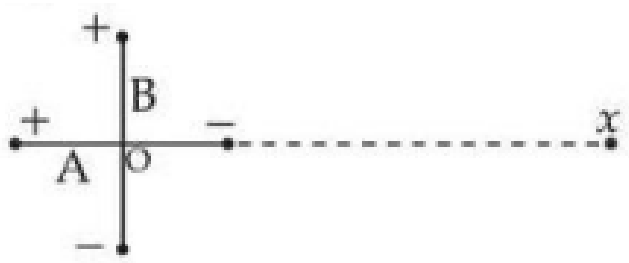
11. Two short electric dipoles A and B having dipole moments p_1 and p_2 respectively are placed with their axes mutually perpendicular as shown in the figure. The resultant electric field at a point x is making an angle of 60° with the line joining points O and x. The ratio of dipole moments $\frac{p_2}{p_1}$ is:



(A) $\frac{\sqrt{3}}{2}$

(B) $2\sqrt{3}$

(C) $\frac{1}{\sqrt{3}}$

(D) $\sqrt{3}$

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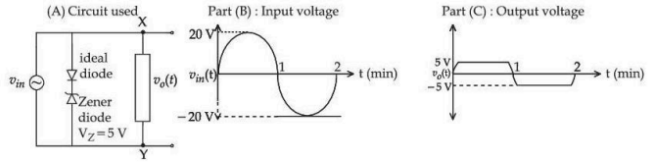
12. For the given circuit (shown in part A) the time dependent input voltage $v_{in}(t)$ and corresponding output $v_o(t)$ are shown in parts (B) and (C), respectively. Identify the components that are used in the circuit between X and Y.



(A)

(B)

(C)

(D)

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13. When a coil is placed in a time dependent magnetic field the power dissipated in it is P. The number of turns, area of the coil and radius of the coil wire are N, A and r respectively. For a second coil the number of turns, area of the coil and radius of the coil wire are $2N, 2A$ and $3r$ respectively. If the first coil is replaced with second coil the power dissipated in it is $\sqrt{2}\alpha P$. The value of α is:

(A) 36

(B) $128\sqrt{2}$

(C) 16

(D) 64

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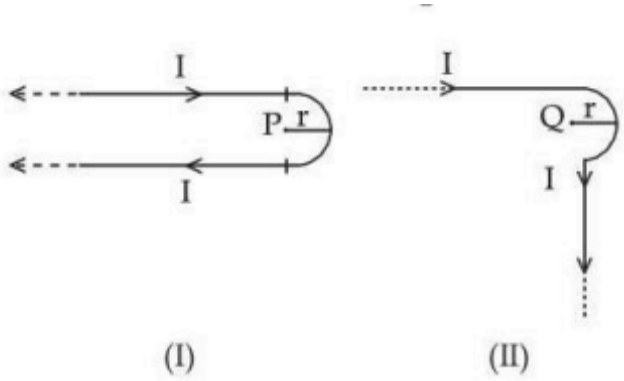
14. Two identical long current carrying wires are bent into the shapes shown. If the magnitude of magnetic fields at the centres P and Q of a semicircular arc are B_1 and B_2 respectively, then the ratio $\frac{B_1}{B_2}$ is:



(A) $\frac{2+\pi}{1+\pi}$

(B) $\frac{1+\pi}{1-\pi}$

(C) $\frac{2+\pi}{1-\pi}$

(D) $\frac{1+\pi}{2-\pi}$

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15. For a thin symmetric prism made of glass (refractive index 1.5), the ratio of incident angle and minimum deviation will be _____.

(A) 3 : 4

(B) 3 : 2

(C) 2 : 1

(D) 1 : 2

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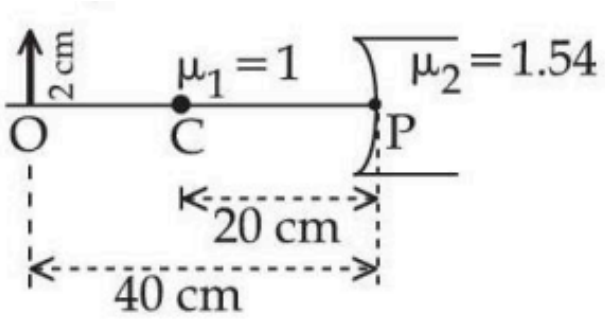
16. Refer the figure below. μ_1 and μ_2 are refractive indices of air and lens material respectively. The height of image will be _____ cm.



(A) 1

(B) 0.5

(C) 1.2

(D) 0.25

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17. For a certain metal, when monochromatic light of wavelength λ is incident, the stopping potential for photoelectrons is $3V_0$. When the same metal is illuminated by light of wavelength 2λ, the stopping potential becomes V_0. The threshold wavelength for photoelectric emission for the given metal is $\alpha\lambda$. The value of α is:

(A) 1

(B) 4

(C) 2

(D) 3

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18. An electromagnetic wave travelling in x-direction is described by the field equation

$$E_y = 300 \sin \omega \left(t - \frac{x}{c} \right).$$

If the electron is restricted to move in y-direction only with speed 1.5×10^6 m/s, then the ratio of maximum electric and magnetic forces acting on the electron is:

(A) 200

(B) 150

(C) 400

(D) 300

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19. Angular momentum of an electron in a hydrogen atom is $\frac{3h}{\pi}$. Then the energy of the electron is ____ eV.

(A) -1.51

(B) -0.85

(C) -0.38

(D) -0.28

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20. A liquid drop of diameter 2 mm breaks into 512 droplets. The change in surface energy is $\alpha \times 10^{-6}$ J. (Take surface tension of liquid $= 0.08$ N/m). The value of α is ____.

(A) 10

(B) 7

(C) 8

(D) 11

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21. In single slit diffraction pattern, the wavelength of light used is 628 nm and slit width is 0.2 mm. The angular width of central maximum is $\alpha \times 10^{-2}$ degrees. The value of α is ____.

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22. A vessel contains $0.15\,\text{m}^3$ of a gas at pressure 8 bar and temperature $140°$C with $c_p = 3R$ and $c_v = 2R$. It expands adiabatically till pressure falls to 1 bar. The work done during this process is ____ kJ. (R is gas constant)

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23. A $1\,\mu$C charge moving with velocity

$$\vec{v} = (\hat{i} - 2\hat{j} + 3\hat{k})\,\text{m/s}$$

in the region of magnetic field

$$\vec{B} = (2\hat{i} + 3\hat{j} - 5\hat{k})\,\text{T}$$

The magnitude of force acting on it is $\sqrt{\alpha} \times 10^{-6}$ N. The value of α is ____.

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24. A uniform wire of length l of weight w is suspended from the roof with a weight W at the other end. The stress in the wire at $\frac{l}{3}$ distance from the top is

$$\left(\frac{W}{A} + \frac{2}{\gamma}\frac{w}{A}\right)$$

where A is the cross sectional area of the wire. The value of γ is ____.

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25. A tub is filled with water and a wooden cube $10\,\text{cm} \times 10\,\text{cm} \times 10\,\text{cm}$ is placed in the water. The wooden cube is found to float on the water with a part of it submerged in water. When a metal coin is placed on the wooden cube, the submerged part is increased by 3.87 cm. The mass of the metal coin is ____ gram. (Take water density $= 1\,\text{g/cm}^3$ and density of wood as $0.4\,\text{g/cm}^3$).
