

JEE–MAIN EXAMINATION – JANUARY 2026

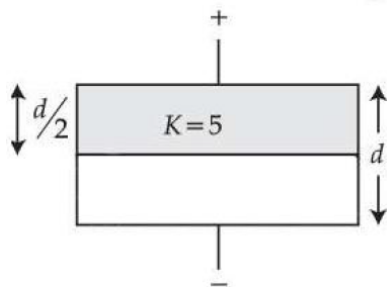
(HELD ON THURSDAY 02nd APRIL 2026

TIME : 9:00 AM TO 12:00 NOON

Section - A

26. The dimensional formula of $\frac{1}{2}\epsilon_0 E^2$ (ϵ_0 = permittivity of vacuum and E = electric field) is $M^a L^b T^c$. The value of $2a - b + c =$ _____ .
 (1) 0 (2) 1 (3) -1 (4) 2
27. The diameter of a wire measured by a screw gauge of least count 0.001 cm is 0.08 cm. The length measured by 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/m². The value of α is _____.
 (Ignore the contribution of the load to Young's modulus error calculation)
 (1) 1.3 (2) 1.65 (3) 0.13 (4) 0.25
28. The velocity of a particle is given as $\vec{v} = -x\hat{i} + 2y\hat{j} - z\hat{k}$ m/s. The magnitude of acceleration at point (1, 2, 4) is _____ m/s².
 (1) $\sqrt{6}$ (2) 9 (3) $\sqrt{33}$ (4) 0
29. The position of an object having mass 0.1 kg as a function of time t is given as $\vec{r} = (10t^2\hat{i} + 5t^3\hat{j})$ m. At t = 1 s, which of the following statements are correct ?
 A. The linear momentum $\vec{p} = (2\hat{i} + 1.5\hat{j})$ kg. m/s
 B. The force acting on the object $\vec{F} = (2\hat{i} + 3\hat{j})$ N.
 C. The angular momentum of the object about its origin $\vec{L} = 15\hat{k}$ Js.
 D. The torque acting on the object about its origin $\vec{\tau} = 20\hat{k}$ Nm.
 Choose the correct answer from the options given below :
 (1) A, B and C only (2) B, C and D only (3) A, C and D only (4) A, B and D only
30. A planet (P₁) is moving around the star of mass 2M in the orbit of radius R. Another planet (P₂) is moving around another star of mass 4M in a orbit of radius 2R. Ratio of time periods of revolution of P₂ and P₁ is _____.
 (1) $\frac{1}{2}$ (2) 2 (3) 4 (4) $\frac{1}{4}$
31. 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/s².
 (1) 150 (2) 120 (3) 130 (4) 170

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



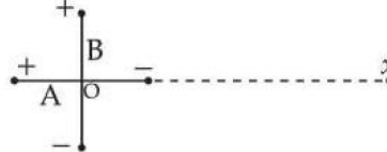
- (1) 33.34 (2) 66.67 (3) 200 (4) 400
33. Heat is supplied to a diatomic gas at constant pressure. Then the ratio of $\Delta Q : \Delta U : \Delta W$ is _____.
- (1) 2 : 3 : 5 (2) 5 : 3 : 2 (3) 2 : 5 : 7 (4) 7 : 5 : 2

34. 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_{S1} and E_{S2} respectively. The value of $\frac{E_{S1}}{E_{S2}}$ is _____.

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

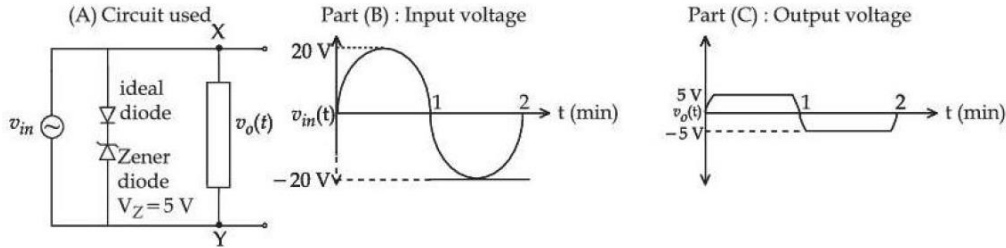
35. The equation of a plane progressive wave is given by $y = 5 \cos \pi \left(200t - \frac{x}{150} \right)$ where x and y are in cm and t is in second. the velocity of the wave is _____ m/s.
- (1) 120 (2) 150 (3) 200 (4) 300

36. Two short electric dipoles A and B having dipole moment p_1 and p_2 respectively are placed with their axis 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 the dipole moments p_2/p_1 is _____.



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

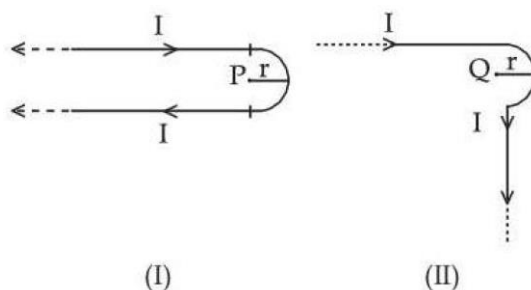
37. For the given circuit (shown in part (A)) the time dependent input voltage $v_{in}(t)$ and corresponding output $v_o(t)$ are shown in part (B) and part (C), respectively. Identify the components that are used in the circuit between points X and Y.



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

38. 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 coils number of turns, area of the coil and radius of the coil wire are $2N$, $2A$ and $3r$ respectively. When the first coil is replaced with second coil the power dissipated in it is $\sqrt{2} \alpha P$. The value of α is _____ .
 (1) 36 (2) $128\sqrt{2}$ (3) 16 (4) 64

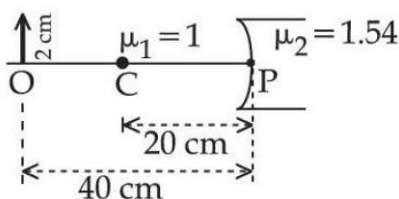
39. Two identical long current carrying wires are bent into the shapes shown in the following figures. If the magnitude of magnetic fields at the centres P and Q of a semicircular arc are B_1 and B_2 respectively, then the ratio $\frac{B_1}{B_2}$ is _____.



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

40. For a thin symmetric prism made of glass (refractive index 1.5), the ratio of incident angle and minimum deviation will be _____.
 (1) 3 : 4 (2) 3 : 2 (3) 2 : 1 (4) 1 : 2

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



- (1) 1 (2) 0.5 (3) 1.2 (4) 0.25

42. 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 , then the stopping potential becomes V_0 . The threshold wavelength for photoelectric emission for the given metal is $\lambda\alpha$. The value of α is _____.
 (1) 1 (2) 4 (3) 2 (4) 3

43. An electromagnetic wave travelling in x-direction is described by 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 of 1.5×10^6 m/s then ratio of maximum electric and magnetic forces acting on the electron is _____.
 (1) 200 (2) 150 (3) 400 (4) 300

44. Angular momentum of an electron in a hydrogen atom is $\frac{3h}{\pi}$, then the energy of the electron is _____ eV.
 (1) -1.51 (2) -0.85 (3) -0.38 (4) -0.28

45. A liquid drop of diameter 2 mm breaks into 512 droplets. The change in surface energy is $\alpha \times 10^{-6}$ J. The value of α is _____. (Take surface tension of liquid = 0.08 N/m)
- (1) 10 (2) 7 (3) 8 (4) 11

Section - B

46. 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 _____.
47. A vessel contains 0.15 m^3 of a gas at pressure 8 bar and temperature 140°C with $c_p = 3R$ and $c_v = 2R$. It is expanded adiabatically till pressure falls to 1 bar. The work done during this process is ____ k J. (R is gas constant)
48. $1 \mu\text{C}$ 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 $\sqrt{\alpha} \times 10^{-}$ N. The value of α is _____.
49. A uniform wire of length l of weight w is suspended from the roof with a weight of W at the other end. The stress in the wire at $\frac{l}{3}$ distance from the top is $\left(\frac{W}{A} + \frac{2w}{\gamma A} \right)$, where, A is the cross sectional area of the wire. The value of γ is _____.
50. 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 as 1 g/cm^3 and density of wood as 0.4 g/cm^3)