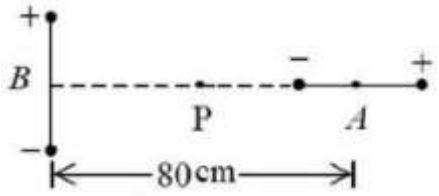
JEE–MAIN EXAMINATION – JANUARY 2026

(HELD ON FRIDAY 23rd JANUARY 2026) **TIME : 3:00 PM TO 6:00 PM**

Q.26 Two shorts dipoles (A, B), A having charges $\pm 2\mu C$ and length 1 cm and B having charges $\pm 4\mu C$ and length 1 cm are placed with their centres 80 cm apart as shown in the figure. The electric field at a point P, equi-distant from the centres of both dipoles is ____ N/C.



(1) $\frac{9}{16}\sqrt{2}\times 10^5$ (2) $\frac{9}{16}\sqrt{2}\times 10^4$ (3) $9\sqrt{2}\times 10^4$ (4) $4.5\sqrt{2}\times 10^4$

Q.27 To compare EMF of two cells using potentiometer the balancing lengths obtained are 200 cm and 150 cm. The least count of scale is 1 cm. The percentage error in the ratio of EMFs is ____

(1) 1.55 (2) 1.75 (3) 1.65 (4) 1.45

Q.28 Which of the following pair of nuclei are isobars of the element?

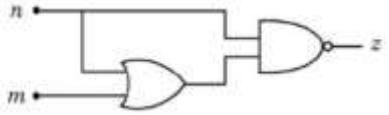
(1) ${}_1^2H$ and ${}_1^3H$ (2) ${}_{92}^{236}U$ and ${}_{92}^{238}U$ (3) ${}_{80}^{198}Hg$ and ${}_{79}^{9}Au$ (4) ${}_1^3$ and ${}_2^3He$

Q.29 Suppose a long solenoid of 100 cm length, radius 2 cm having 500 turns per unit length, carries a current $I = 10\sin(\omega t)A$, where $\omega = 1000 rad./s$. A circular conducting loop (B) of radius 1 cm coaxially slided through the solenoid at a speed $v = 1\ cm/s$. The r.m.s. current through the loop when the coil B is inserted 10 cm inside the solenoid is $\alpha/\sqrt{2}\mu A$. The value of α is _____.

[Resistance of the loop $= 10\Omega$]

(1)197 (2) 80 (3)280 (4)100

Q.30 For the given logic gate circuit, which of the following is the correct truth table?



(1)

n	m	z
0	0	0
0	1	1
1	1	0
1	0	1

(2)

n	m	z
0	0	1
0	1	1
1	1	0
1	0	0

(3)

n	m	z
0	0	1
0	1	0
1	1	0
1	0	0

(4)

n	m	z
0	0	1
0	1	0
1	1	1
1	0	0

Q.31 The ratio of speeds of electromagnetic waves in vacuum and a medium, having dielectric constant $k = 3$ and permeability of $\mu = 2\mu_0$, is

(μ_0 = permeability of vacuum)

(1) 36:1 (2) 6 : 1 (3) $\sqrt{6}$:1 (4) 3 : 2

Q.32 A small metallic sphere of diameter 2 mm and density $10.5\ g/cm^3$ is dropped in glycerine having viscosity 10 Poise and density $1.5\ g/cm^3$ respectively. The terminal velocity attained by the sphere is ____ cm/s.

$(\pi \ \frac{22}{7}$ and $g = 10\ m/s^2)$

(1) 3.0 (2) 1.5 (3) 1.0 (4) 2.0

Q.33 A prism of angle 75° and refractive index $\sqrt{3}$ is coated with thin film of refractive index 1.5 only at the back exit surface. To have total internal reflection at the back exit surface the incident angle must be ____ .

$(\sin 15^\circ = 0.25$ and $\sin 25^\circ = 0.43)$

(1) $< 15°$ (2) between 15° and 20°

(3) $> 25°$ (4) 15°

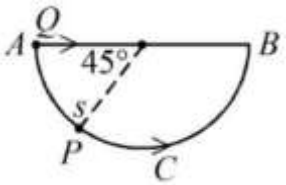
Q.34 The internal energy of a monoatomic gas is 3nRT. One mole of helium is kept in a cylinder having internal cross section area of 17 cm^2 and fitted with a light movable frictionless piston. The gas is heated slowly by suppling 126 J heat. If the temperature rises by $4^\circ C$, then the piston will move ____ cm . (atmospheric pressure $= 10^5$ Pa)

(1) 1.55 (2) 1.45 (3) 15.5 (4) 14.5

Q.35 A body of mass 14 kg initially at rest explodes and breaks into three fragments of masses in the ratio $2:2:3$. The two pieces of equal masses fly off perpendicular to each other with a speed of $18\ m/s$ each. The velocity of the heavier fragment is ____ m/s

(1) $24\sqrt{2}$ (2) $10\sqrt{2}$ (3) 12 (4) $12\sqrt{2}$

Q.36 A bead P sliding on a frictionless semi-circular string (ACB) and it is at point **S** at $t = 0$ and at this instant the horizontal component of its velocity is v . Another bead Q of the same mass as P is ejected from point A at $t = 0$ along the horizontal string AB , with the speed v , friction between the beads and the respective strings may be neglected in both cases. Let t_P and t_Q be the respective times taken by beads P and Q to reach the point B , then the relation between t_P and t_Q is



(1) $t_P > t_Q$ (2) $t_P > 1.25 t_Q$ (3) $t_P = t_Q$ (4) $t_P < t_Q$

Q.37 The current passing through a conducting loop in the form of equilateral triangle of side $4\sqrt{3}$ cm is 2 A. The magnetic field at its centroid is $\alpha \times 10^{-5}$ T . The value of α is ____ .

(Given : $\mu_o = 4\pi \times 10^{-7}$ SI units)

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

Q.38 Two charges $7\mu C$ and $-2\mu C$ are placed at $(-9,0,0)$cm and $(9,0,0)$cm respectively in an external field $E = \frac{A}{r^2}\hat{r}$, where $A = 9 \times 10^5\ N/C.m^2$.

Considering the potential at infinity is 0 , the electrostatic energy of the configuration is ____ J.

(1)1.4 (2) 24.3 (3) -90.7 (4) 49.3

Q.39 When an unpolarized light falls at a particular angle on a glass plate (placed in air), it is observed that the reflected beam is linearly polarized. The angle of refracted beam with respect to the normal is ____ .

$\left(\tan^{-1}(1.52) = 57.7^{\circ}\right.$, refractive indices of air and glass are 1.00 and 1.52 , respectively.)

(1) 32.3° (2) 42.6° (3) 36.3° (4) 39.6°

Q.40 One mole of an ideal diatomic gas expands from volume V to 2V isothermally at a temperature $27^{\circ}C$ and does W joule of work. If the gas undergoes same magnitude of expansion adiabatically from $27^{\circ}C$ doing the same amount of work W , then its final temperature will be (close to) ____ $^{\circ}C$.

$\left(\log_e 2 = 0.693\right)$

(1) -30 (2) -117 (3) -189 (4) -56

Q.41 A circular loop of radius 7 cm is placed in uniform magnetic field of 0.2 T directed perpendicular to plane of loop. The loop is converted into a square loop in 0.5 s. The EMF induced in the loop is ____ mV.

(1) 6.6 (2) 13.2 (3) 8.25 (4) 1.32

Q.42 An air bubble of volume $2.9\ cm^3$ rises from the bottom of a swimming pool of 5 m deep. At the bottom of the pool water temperature is $17^{\circ}C$. The volume of the bubble when it reaches the surface, where the water temperature is $27^{\circ}C$, is ____ cm^3 .

($g = 10\ m/s^2$, density of water $= 10^3\ kg/m^3$, and 1 atm pressure is 10^5 Pa)

(1) 3.0 (2) 4.2 (3) 2.0 (4) 4.5

Q.43 A paratrooper jumps from an aeroplane and opens a parachute after 2 s of free fall and starts deaccelerating with $3\ m/s^2$. At 10 m height from ground, while descending with the help of parachute, the speed of paratrooper is $5\ m/s$. The initial height of the airplane is ____ m. $\left(g = 10\ m/s^2\right)$

(1) 92.5 (2) 62.5 (3) 82.5 (4) 20

Q.44 A parallel plate capacitor with plate separation 5 mm is charged by a battery. On introducing a mica sheet of 2 mm and maintaining the connections of the plates with the terminals of the battery, it is found that it draws 25% more charge from the battery. The dielectric constant of mica is ____ .

(1) 1.0 (2) 2.0 (3) 1.5 (4) 2.5

Q.45 A block is sliding down on an inclined plane of slope θ and at an instant $t = 0$ this block is given an upward momentum so that it starts moving up on the inclined surface with velocity u . The distance (S) travelled by the block before its velocity become zero, is ____ .

(g = gravitational acceleration)

(1) $\frac{u^2}{4g\sin\theta}$ (2) $\frac{2u^2}{g\cos\theta}$ (3) $\frac{u^2}{2\ g\cos\theta}$ (4) $\frac{u^2}{\sqrt{2}g\cos\theta}$

SECTION – B

Q.46 The velocity of sound in air is doubled when the temperature is raised from $0^{\circ}C$ to $\alpha^{\circ}C$.

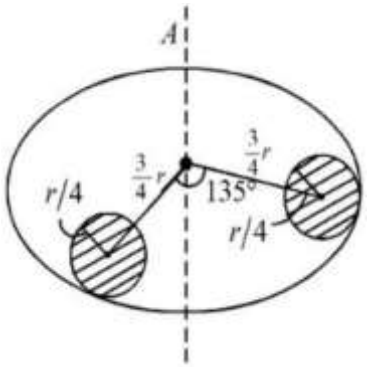
The value of is .

Q.47 The average energy released per fission for the nucleus of $^{235}_{92}$ is 190 MeV. When all the atoms of 47 g pure $^{235}_{92}U$ undergo fission process, the energy released is $\alpha \times 10^{23}$ MeV. The value of α is ____ .
(Avogadro Number $= 6 \times 10^{23}$ per mole)

Q.48 The size of the images of an object, formed by a thin lens are equal when the object is placed at two different positions 8 cm and 24 cm from the lens. The focal length of the lens is ____ cm .

α ____

Q.49 Suppose there is a uniform circular disc of mass M kg and radius r m shown in figure. The shaded regions are cut out from the disc. The moment of inertia of the remainder about the axis A of the disc is given by $\frac{x}{256}Mr^2$. The value of x is ____ .



Q.50 A ball of radius r and density ρ dropped through a viscous liquid of density σ and viscosity η attains its terminal velocity at time t, given by $t = A\rho^a r^b \eta^c \sigma^d$, where A is a constant and a, b, c and d are integers. The value of $\frac{b+c}{a+d}$ is ____ .