Examrace

Competitive Exams Physics Objective Questions Part 8

Q-1 A gold coin has a charge of + 10-4 C, The number of electrons removed from it is

(a) 106

(b) 1.6×1010

(c) 1.6×1025

(d) 1.6×10

Q-2 A small sphere of mass m and electric charge q, is suspended by a light thread. A second sphere carrying a charge q2 is placed directly below the first sphere at a distance ‘d’ away. Then

(a) Tension in thread may reduce to zero if the spheres are positively charged

(b) Tension in thread may reduce to zero if the spheres are oppositely charged

(c) Tension in thread can never be zero

(d) Tension in thread is independent of the nature of the charges

Q-3 A pitch ball covered with a tin foil having a mass m kg hangs by a fine silk thread of length ℓ metres in an electric field E. When the ball is given an electric charge of q coulomb, is stands out d meters apart from the vertical line . The magnitude of an electric field will be

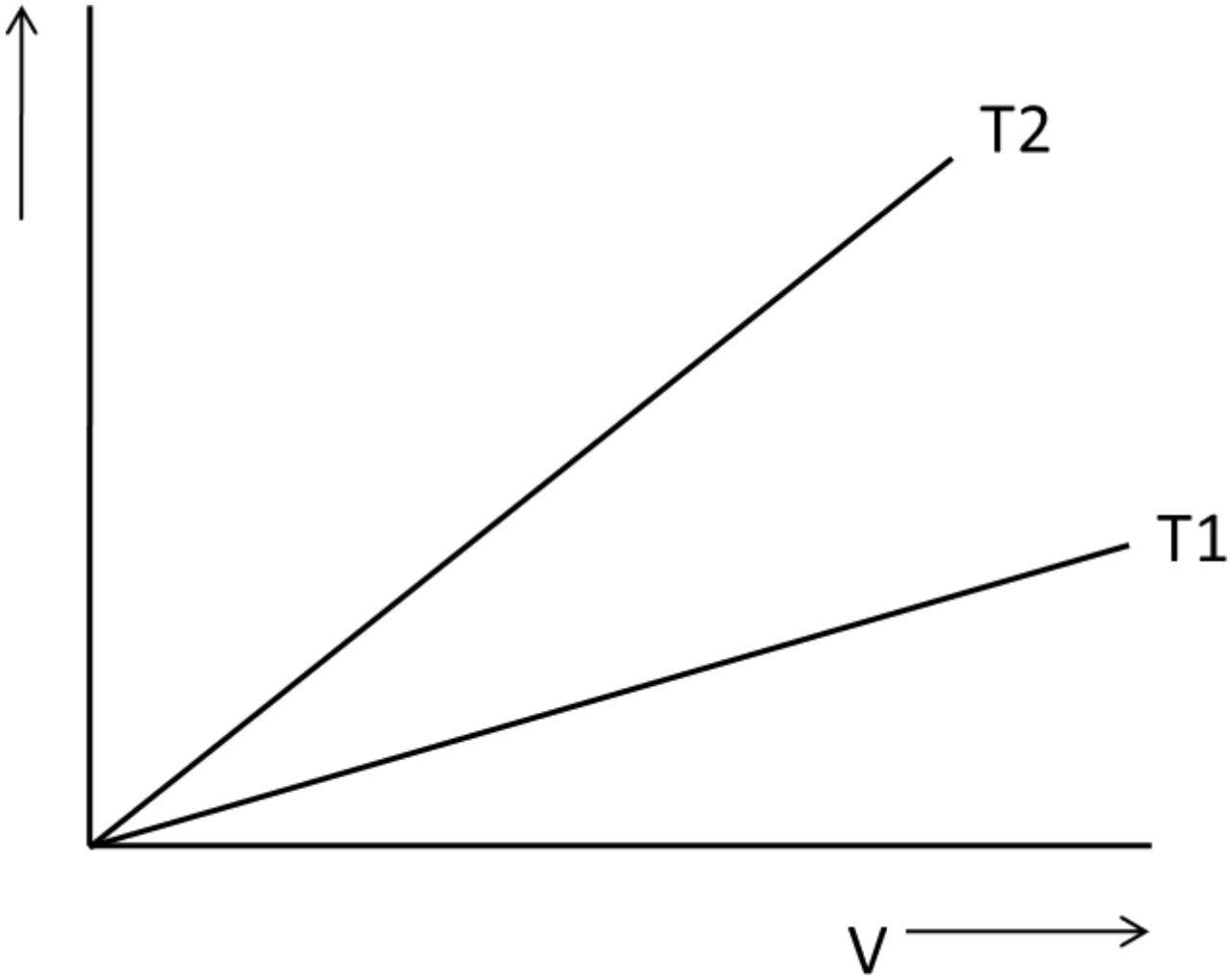
(a) $\frac{mgd}{\sqrt{l^2-d^2}}$

(b) $\frac{mg^2}{l^2}$

(c) $\frac{mg^2}{q\sqrt{l^2-d^2}}$

(d) $\frac{mgd}{q\sqrt{l^2-d^2}}$

Q-4. The current I and voltage V graphs for a given metallic wire of two different temperatures T1 and T2 are shown in the following figure. It is concluded that



Shown in the following figure. It is concluded that

(a) T1 > T2

(b) T1 < T2

(c) T1 = T2

(d) T1 = 2T2

Q-5 The resistance of a 20 cm long wire is 5 Ω. The wire is stretched to form a uniform wire of 40 cm length. The resistance now will be

(a) 5Ω

(b) 10Ω

(c) 20Ω

(d) 200 Ω

Q-6 If a copper wire is stretched to make its radius decrease in its resistance is approximately

(a) 0.1%

(b) 0.2%

(c) 0.4%

(d) 0.8%

Q-7. When a charged particle is acted on only by a magnetic force, its

(a) Potential energy changes

(b) Its kinetic energy changes

(c) Total energy changes

(d) Energy does not change

Q-8. A positively charged particle projected towards east is deflected towards north by a magnetic field. The field may be

(a) Towards west

(b) Towards south

(c) Upwards

(d) Downwards

Q-9 The permanent magnetic moment of the atoms of a material is not zero. The material

(a) Must be paramagnetic

(b) Must be diamagnetic

(c) Must be ferromagnetic

(d) May be paramagnetic

Q-10 A paramagnetic material is kept in a magnetic field. The field is increased till the magnetization becomes constant. If the temperature is now decreased. the magnetization

(a) Will decrease

(b) Will increase

(c) Remain constant

(d) May increase or decrease

Q-11A metallic wire bent in form of a semi-circle of radius 0.1 m is moved in a direction parallel to its plane, but perpendicular to a magnetic field B = 20m T with a velocity of 10m/sec. What is the induced e.m.f. in wire ?

(a) $4 \times 10 - 3\ volts$

(b) $4 \times 10 - 2\ volts$

(c) $4 \times 10 - 1\ volts$

(d) None of these

Q-12 A glass rod of length ℓ moves with a velocity v in a uniform magnetic field B. what will be the emf induced in the rod

(a) Zero

(b) 0.01 volts

(c) 0.1 volts

(d) None of these

Q-13 A 10 μF capacitor is connected across a 200 V 50 Hz A.C. supply. The peak current through the circuit is

(a) $0.6\,A$

(b) $0.6\sqrt{2}\,A$

(c) $\left(0.6\sqrt{2}\right)\,A$

(d) $0.6\frac{\pi}{2}\,A$

Q-14 An alternating voltage $E = 200\sqrt{2}$ sin (100t) is connected to a $1\,\mu F$ capacitor through an A.C. ammeter. The reading of the ammeter shall be

(a) 10 mA

(b) 20 mA

(c) 40 mA

(d) 80mA

Q-15 The first diffraction minima due to a single slit diffraction is at $\theta = 30^\circ$ for a light of wavelength $5000\ \mathring{A}$ The width of the slit is

(a) $5 \times 10^{-5}\ cm$

(b) $10 \times 10^{-5}\ cm$

(c) $2.5 \times 10^{5}\ cm$

(d) $1.25 \times 10^{-5}\ cm$

Answer

Q-16 A beam of light of wavelength 600 nm from a distant source falls on a single slit 1.00 mm wide and the resulting diffraction pattern is observed on a screen 2 M away. The distance between the first dark fringe on either side of the central maxima is

(a) 1.2 cm

(b) 1.2 cm

(c) 2.4 cm

(d) 4.8 cm

Q-17 A concave mirror of focal length F produces a real image n times the size of the object. The distance of the object from the mirror is

(a) $(n-1)F$

(b) $(n+1)F$

(c) $\frac{n+1}{n}F$

(d) $\frac{n-1}{n}F$

Q-18 An object is placed at a distance of 2f from a concave mirror. Light reflected from the mirror falls on a plane mirror. The distance of the plane mirror from the concave mirror equals f. The distance of the final image from the concave mirror (due to reflection at both concave and plane mirror) is

(a) f

(b) $\frac{f}{2}$

(c) $2f$

(d) $Zero$

Q-19 A body starts from rest and moves with a uniform acceleration. The ratio of the distance covered in n sec is

(a) $\frac{2}{n}-\frac{1}{n^2}$

(b) $\frac{1}{n^2}-\frac{1}{n}$

(c) $\frac{2}{n^2}-\frac{1}{n}$

(d) $\frac{1}{n}-\frac{1}{n^2}$

Q-20 The range of a projectile when launched at angle θ is same as when launched at angle 2θ . What is the value of ?

(a) $15°$

(b) $30°$

(c) $45°$

(d) $60°$

Q-21A balloon is descending at constant acceleration α , The mass of the balloon is M. When a mass m is released from the balloon, it starts rising with the same acceleration α. Assuming that the volume does not change when the mass is released, when is the value of m?

(a) $\frac{\alpha}{\alpha+g} M$

(b) $\frac{2\alpha}{\alpha+g} M$

(c) $\frac{\alpha+g}{\alpha} M$

(d) $\frac{\alpha+g}{2\alpha} M$

Q-22 A heavy block of mass M is slowly placed on a conveyer belt moving with a speed v. the coefficient of friction between the block and the belt is μ. Through what distance will the block slide on the belt ?

(a) $\frac{v}{\mu g}$

(b) $\frac{v^2}{\mu g}$

(c) $\frac{v}{2\mu g}$

(d) $\frac{v^2}{2\mu g}$

Q-23. A balloon is descending at constant acceleration α, The mass of the balloon is M. When a mass m is released from the balloon, it starts rising with the same acceleration α. Assuming that the volume does not change when the mass is released, when is the value of m?

(a) $\frac{\alpha}{\alpha+g} M$

(b) $\frac{2\alpha}{\alpha+g} M$

(c) $\frac{\alpha+g}{\alpha} M$

(d) $\frac{\alpha+g}{2\alpha} M$

Q 67. A heavy block of mass M is slowly placed on a conveyer belt moving with a speed v. the coefficient of friction between the block and the belt is μ. Through what distance will the block slide on the belt?

(a) $\frac{v}{\mu g}$

(b) $\frac{v^2}{\mu g}$

(c) $\frac{v}{2\mu g}$

(d) $\frac{v^2}{2\mu g}$

Q 68.

Under the action of a force, a $2\,kg$ body moves such that its position x as a function of time is given by $x = \frac{t^2}{3}$ where x is in metre and t I second. The work done by the force in the first $2\,s$ is

(a) 1,600 J

(b) 160 J

(c) 16 J

(d) 1.6 J

Q-24 Three particles of mass M each are placed at corners of an triangle of side 'd' if the sides are increased to '2d' then

(a) The P.E. = $\frac{3GM^2}{2d}$

(b) Work done = $\frac{3GM^2}{2d}$

(c) Work done = $\frac{GM^2}{2d}$

(d) P.E. = $\frac{-3GM}{2d}$

Q-25 The de Broglie wavelength of a neutron when its kinetic energy is K, is λ. What will be its wavelength when its kinetic energy is 4k?

(a) $\frac{\lambda}{4}$

(b) $\frac{\lambda}{2}$

(c) 2λ

(d) 4λ

Q-26 According to Bohr's theory. the radius of the nth orbit of an atom of atomic number Z is proportional to

(a) $\frac{n^2}{z^2}$

(b) $\frac{n^2}{z}$

(c) $\frac{n}{z}$

(d) $n2z2$

Q-27 When $\frac{235}{92}U$ undergoes fission , 0.1 % of its original mass is changed into energy, How much energy is released if 1 kg of $\frac{235}{92}U$ undergoes fission?

(a) $9 \times 1010\,J$

(b) $9 \times 1011\,J$

(c) $9 \times 1012\,J$

(d) $9 \times 1015\,J$

Q-28 The alternating current gain of a junction transistor in common base arrangement is 0.98. what is the change in the base current corresponding to a change of 4 mA in the emitter current and change of 4.9 mA in the collector current?

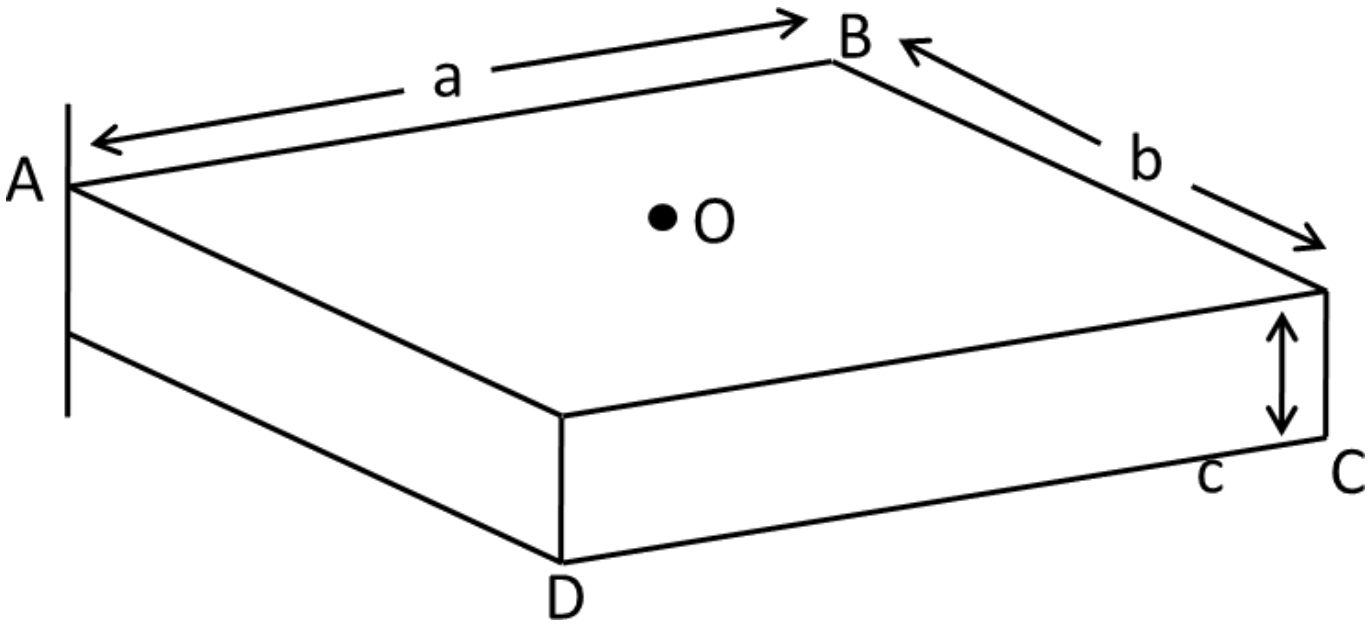
(a) 0.1 mA

(b) 0.2 mA

(c) $0.3\,mA$

(d) 0.4 mA

Q-29 Fig. shows a uniform solid block of mass M and edge lengths a, b and c. its M.l about an axis through one edge and perpendicular (as known) to the large face of the block



(a) $\frac{M}{3}\left(a_2+b_2\right)$

(b) $\frac{M}{4}\left(a_2+b_2\right)$

(c) $\frac{7M}{12}\left(a_2+b_2\right)$

(d) $\frac{M}{12}\left(a_2+b_2\right)$

Q-30 A thick walled hollow sphere has outer radius R. it rolls down an inclined plane without slipping. And its speed at the bottom is v. if the inclined plane is frictionless and the sphere slides down without rolling. Its speed at the bottom will be $\frac{5v}{4}$. What is the radius of gyration of the sphere ?

(a) $\frac{R}{\sqrt{2}}$

(b) $\frac{R}{2}$

(c) $\frac{3R}{4}$

(d) $\sqrt{\frac{3R}{4}}$

Q-31 How much force is required to produce an increase of 0.2% in the length of a brass wire of diameter 0.6 mm? (Young's modulus for brass $= 0.9\,x\,1011\,N/m2$)

(a) Nearly 17 N

(b) Nearly 34 N

(c) Nearly 51 N

(d) Nearly 68 N

Q-32 A liquid drops at temperature T, isolated from its surroundings, breaks into a number of droplets. The temperature of the droplets will be

(a) Equal to T

(b) Greater than T

(c) Less than T

(d) Either (a), (b), or (c) depending on the surface tension of the liquid

Q-33 In SHM the net force towards mean position is related to its displacement (x) from mean position by the relation

(a) $F \propto x$

(b) $F \propto \frac{1}{x}$

(c) $F \propto x2$

(d) $F \propto \frac{1}{x^2}$

Q-34 The acceleration (a) of SHM at mean position is

(a) Zero

(b) $\propto x$

(c) $\propto x2$

(d) None of these

Q-35 When the temperature of air rises by 3 K from 300 K, what is the percentage rise in the velocity of sound?

(a) 0.5%

(b) 1%

(c) 2%

(d) None of these

Q-36 A tuning fork vibrating with a sonometer having 20 cm wire produces 5 beats per beat frequency does not change. If the length of the wire is changed to 21 cm. the frequency of tuning fork is

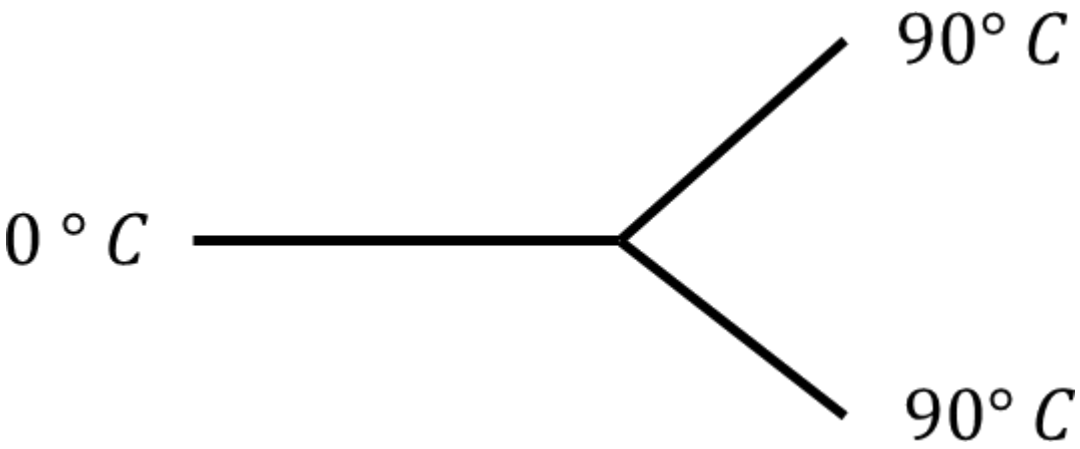
(a) 200 Hz

(b) 210 Hz

(c) 205 Hz

(d) 25 Hz

Q-37. Three rods made of the same material and having the same cross-section have been joined as shown in the fig. Each rod is of the same length. The left and right ends are kept at 0°C and 90°C respectively. The temperature of the junction of the three rods will be



(a) $45° C$

(b) $60° C$

(c) $30° C$

(d) $20° C$

Q-38 If γ be the ratio of specific heats of a perfect gas, the number of degrees of freedom of a molecule of the gas is:

(a) $\frac{25}{2}(\gamma - 1)$

(b) $\frac{3\gamma-1}{2\gamma-1}$

(c) $\frac{2}{\gamma-1}$

(d) $\frac{9}{2}(\gamma - 1)$

Q-39 An ideal gas heat engine operates in Carnot cycle between $227°C$ and $127°C$. It absorbs 6×10^4 cal of heat at higher temperature. Amount of heat converted to work is:

(a) $2.4 \times 10^4\ cal$

(b) $6 \times 10^4\ cal$

(c) $1.2 \times 10^4\ cal$

(d) $4.8 \times 10^4\ cal$

Q-40 In a room where the temperature is $30^\circ C$, a body cools from $61^\circ C$ *to* $59^\circ C$ in 4 min. The time (in min) taken by the body to cool from $51^\circ C$ *to* $49^\circ C$ will be

(a) 4

(b) 6

(c) 5

(d) 8