



- 1) The dimensional formula of pressure gradient, (pressure variation with depth in a container), can be described as;
 - a) $[ML^{-3}T^{-2}]$
 - b) $[ML^{-2}T^{-2}]$
 - c) $[ML^{-4}T^{-2}]$
 - d) $[MLT^{-4}]$
- 2) A particle located at origin at time $t = 0$, starts moving along positive y direction with a velocity v that varies as $v = \sqrt{y}$. The displacement of the particle varies with time as
 - a) $\frac{t^3}{3}$
 - b) $\frac{t^{-2}}{2}$
 - c) $\frac{t^2}{4}$
 - d) $2t$
- 3) If photons of energy 1 eV and 2.5 eV respectively are incident on same metallic plate of work function 0.5 eV, one after another, then ratio of maximum kinetic energy of photoelectrons emitted by them will be
 - a) $\frac{1}{2}$
 - b) $\frac{1}{3}$
 - c) $\frac{1}{4}$
 - d) $\frac{1}{6}$
- 4) A sphere of radius $2R$ and charge $3Q$ is placed inside a concentric imaginary sphere of radius $3R$. The flux associated with the imaginary sphere is
 - a) $\frac{3Q}{\epsilon_0}$
 - b) $\frac{Q}{3\epsilon_0}$
 - c) $\frac{6Q}{\epsilon_0}$
 - d) Zero
- 5) A block of mass 30 kg is placed on a rough horizontal surface with a coefficient of friction $\mu_s = 0.5$. If a horizontal force of 125 N acts on the block, then the acceleration of the block will be, (Take $g = 10 \text{ m/s}^2$)
 - a) 1 m/s^2
 - b) 0 m/s^2
 - c) $\frac{5}{6} \text{ m/s}^2$
 - d) 5 m/s^2
- 6) In a thermodynamic process, pressure of a fixed mass of a gas is changed in such a manner that the gas molecules absorb 40 J of heat and 20 J of work is done by the gas. If the initial internal energy of the gas was 50 J, then the final internal energy will be
 - a) 50 J
 - b) 20 J
 - c) 70 J
 - d) 30 J
- 7) A ball hits the floor and rebounds after an inelastic collision. In this case,
 - a) the momentum of the ball just after the collision is the same as that just before the collision
 - b) the mechanical energy of the ball just after the collision remains the same just before the collision
 - c) the total momentum of the ball and the earth is conserved
 - d) None of the above
- 8) The binding energies of the nuclei A and B are E_a and E_b respectively. Three atoms of element B fuse to give one atom of element A and an energy Q is released. Then E_a , E_b and Q are related as
 - a) $E_a - 3E_b = Q$
 - b) $3E_b - E_a = Q$
 - c) $E_a + 3E_b = Q$
 - d) $E_b + 3E_b = Q$
- 9) An object is at center of curvature of a concave mirror having radius of curvature R . If object is displaced by away from the mirror, displacement of image will be
 - a) $\frac{5R}{8}$ towards mirror
 - b) $\frac{5R}{8}$ away from mirror
 - c) $\frac{R}{4}$ towards mirror
 - d) $\frac{R}{4}$ away from mirror
- 10) In the given circuit shown, what could be value of R_1 for current through R to be zero?

 - a) 4Ω
 - b) 40Ω
 - c) 10Ω
 - d) 6Ω
- 11) Mean free path of O_2 gas molecules in rigid container is λ . If temperature of gas is tripled, then new mean free path of O_2 gas molecules is
 - a) λ
 - b) 2λ
 - c) $\frac{\lambda}{2}$
 - d) $\frac{\lambda}{4}$
- 12) In Young's double slit experiment, the separation between 4th maxima and 3rd minima on the screen is n times as that of fringe width. The value of $2n$ is
 - a) 1.5
 - b) 2
 - c) 3
 - d) 4.5