

MHT CET 2026 Mathematics Memory Based Question Paper PDF

Physics

1. A capillary tube of radius r is dipped vertically in water. If the radius of the tube is doubled, then the height of capillary rise becomes:
 - (a) Half
 - (b) Double
 - (c) Four times
 - (d) Unchanged
2. The dimensional formula of coefficient of viscosity is:
 - (a) $[ML^{-1}T^{-1}]$
 - (b) $[MLT^{-1}]$
 - (c) $[ML^{-2}T^{-1}]$
 - (d) $[M^0LT^{-1}]$
3. The radius of gyration of a thin circular ring about its central axis perpendicular to its plane is:
 - (a) $R/\sqrt{2}$
 - (b) R
 - (c) $\sqrt{2}R$
 - (d) $2R$
4. Two soap bubbles of radii 2 cm and 4 cm combine to form a bigger bubble. The radius of the new bubble will be:
 - (a) 6 cm
 - (b) 4.8 cm
 - (c) 8 cm
 - (d) 5 cm
5. A body floats in water with 80% of its volume submerged. The density of the body is:
 - (a) $0.8\rho_w$
 - (b) $1.25\rho_w$
 - (c) $0.2\rho_w$
 - (d) $0.5\rho_w$
10. A particle executes simple harmonic motion such that its displacement is given by:

$$x = A \cos(\omega t + \phi)$$

If its kinetic energy is equal to three times its potential energy, then the displacement of the particle from the mean position is:

- (a) $\pm \frac{A}{2}$
(b) $\pm \frac{A}{\sqrt{2}}$
(c) $\pm \frac{A}{2\sqrt{2}}$
(d) $\pm \frac{\sqrt{3}A}{2}$
14. A Carnot engine operates between temperatures 500 K and 300 K. If it absorbs 600 J heat from the source, then the work done by the engine is:
- (a) 120 J
(b) 180 J
(c) 240 J
(d) 300 J

Chemistry

6. Which intermolecular force is strongest among the following?
- (a) London dispersion force
(b) Dipole-dipole force
(c) Hydrogen bonding
(d) Dipole-induced dipole force
7. A gas mixture contains 2 moles of oxygen and 3 moles of nitrogen. If the total pressure of the mixture is 5 atm, then the partial pressure of oxygen is:
- (a) 1 atm
(b) 2 atm
(c) 3 atm
(d) 4 atm
8. Which of the following molecules possesses distorted tetrahedral geometry due to the presence of one lone pair on the central atom?
- (a) BF_3
(b) NH_3
(c) CO_2
(d) BeCl_2
9. The conjugate base of H_2PO_4^- is:
- (a) H_3PO_4
(b) HPO_4^{2-}
(c) PO_4^{3-}
(d) H_2PO_3^-
12. A solution contains 0.1 mole of weak acid HA and 0.1 mole of sodium salt NaA in one litre solution. If the dissociation constant of the acid is $K_a = 1 \times 10^{-5}$, then the pH of the solution is:
- (a) 3
(b) 4
(c) 5
(d) 6

Mathematics

11. If the lines:

$$\frac{x-1}{2} = \frac{y+2}{3} = \frac{z}{\lambda}$$

and:

$$\frac{x}{1} = \frac{y-1}{2} = \frac{z+1}{3}$$

are perpendicular to each other, then the value of λ is:

- (a) -8
- (b) -7
- (c) -6
- (d) -5

13. The shortest distance between the lines:

$$\frac{x-1}{1} = \frac{y}{2} = \frac{z+1}{-1}$$

and:

$$\frac{x}{2} = \frac{y-1}{-1} = \frac{z}{1}$$

is:

- (a) $\frac{1}{\sqrt{2}}$
- (b) $\frac{2}{\sqrt{3}}$
- (c) $\sqrt{2}$
- (d) $\frac{\sqrt{6}}{3}$

15. If:

$$y = x^x$$

then:

$$\frac{dy}{dx}$$

is equal to:

- (a) x^x
- (b) $x^x(1 + \log x)$
- (c) x^{x-1}
- (d) $(1+x)^x$