

## MHT CET 2026 Mathematics Memory Based Question Paper PDF

**Physics**

1. Eight identical spherical liquid drops, each falling with a terminal velocity  $v$ , coalesce to form a single large drop. The terminal velocity of the new large drop is:
  - (a)  $2v$
  - (b)  $4v$
  - (c)  $8v$
  - (d)  $16v$
2. A uniform solid sphere of mass  $M$  and radius  $R$  is placed on a smooth horizontal surface. It is struck by a horizontal cue at a height  $h$  above the center. For the sphere to roll without slipping immediately after the impact, the value of  $h$  must be:
  - (a)  $\frac{R}{2}$
  - (b)  $\frac{2R}{5}$
  - (c)  $\frac{2R}{3}$
  - (d)  $\frac{3R}{5}$
3. A disc of mass  $M$  and radius  $R$  has a concentric hole of radius  $\frac{R}{2}$ . Its moment of inertia about an axis passing through its center and perpendicular to its plane is:
  - (a)  $\frac{15}{32}MR^2$
  - (b)  $\frac{13}{32}MR^2$
  - (c)  $\frac{5}{16}MR^2$
  - (d)  $\frac{3}{8}MR^2$
4. The work done in increasing the radius of a soap bubble from  $R$  to  $2R$  is  $W$ . The work done in further increasing its radius from  $2R$  to  $3R$  will be:
  - (a)  $\frac{5}{3}W$
  - (b)  $\frac{4}{3}W$
  - (c)  $\frac{7}{3}W$
  - (d)  $W$
5. Water flows through a horizontal pipe. At one point, the velocity is 2 m/s and the pressure is 2 m of water column. What is the pressure at another point where the velocity is 3 m/s? (Density of water =  $10^3 \text{ kg/m}^3$ )
  - (a) 1.75 m of water
  - (b) 1.2 m of water
  - (c) 1 m of water
  - (d) 1.5 m of water

## Chemistry

6. Identify the type of intermolecular force present between benzene and ammonia.
- (a) Hydrogen bonding
  - (b) Dipole-induced dipole interaction
  - (c) Dipole-dipole interaction
  - (d) Ion-dipole interaction
7. What is the SI unit for rate of diffusion?
- (a)  $\text{cm}^3 \text{ minute}^{-1}$
  - (b)  $\text{dm}^3 \text{ hour}^{-1}$
  - (c)  $\text{dm}^3 \text{ s}^{-1}$
  - (d)  $\text{mL hour}^{-1}$
8. Which of the following pair of liquids has dipole-induced dipole interaction?
- (a) Water and ammonia
  - (b) Water and chloroform
  - (c) Water and benzene
  - (d) Water and ethyl alcohol
9. A certain mass of a gas occupies a volume of  $2.5 \text{ dm}^3$  at NTP. Calculate the change in volume of gas at the same temperature, if pressure of gas is changed to 1.25 atm.
- (a)  $3.0 \text{ dm}^3$
  - (b)  $0.5 \text{ dm}^3$
  - (c)  $4.5 \text{ dm}^3$
  - (d)  $1.5 \text{ dm}^3$
10. A gas occupies a volume of  $4.2 \text{ dm}^3$  at 101 kPa pressure. What volume will the gas occupy if the pressure is increased to 235 kPa keeping the temperature constant?
- (a)  $1.8 \text{ dm}^3$
  - (b)  $3.6 \text{ dm}^3$
  - (c)  $0.9 \text{ dm}^3$
  - (d)  $2.1 \text{ dm}^3$

## Mathematics

11. Let

$$f(x) = \int \frac{x\sqrt{x}}{(1+x)^2} dx \quad (x \geq 0)$$

Then  $f(3) - f(1)$  is equal to:

- (a)  $-\frac{1}{12} + \frac{1}{2} + \frac{\sqrt{3}}{4}$
- (b)  $\frac{1}{12} + \frac{1}{2} - \frac{\sqrt{3}}{4}$
- (c)  $-\frac{1}{6} + \frac{1}{2} + \frac{\sqrt{3}}{4}$
- (d)  $\frac{1}{6} + \frac{1}{2} - \frac{\sqrt{3}}{4}$

12. Gas is being pumped into a spherical balloon at the rate of  $30 \text{ ft}^3/\text{min}$ . Find the rate at which the radius increases when the radius becomes 15 ft.

- (a)  $\frac{1}{30} \text{ ft/min}$
- (b)  $\frac{1}{15} \text{ ft/min}$
- (c)  $\frac{1}{30\pi} \text{ ft/min}$
- (d)  $\frac{1}{20\pi} \text{ ft/min}$

13. Let the function

$$f(x) = \frac{x - |x|}{x}$$

Then:

- (a) the function is continuous everywhere
  - (b) the function is not continuous
  - (c) the function is continuous when  $x < 0$
  - (d) the function is continuous for all  $x$  except zero
14. If the direction ratios of two lines are given by

$$l + m + n = 0$$

$$mn - 2ln + lm = 0$$

then the angle between the lines is:

- (a)  $\frac{\pi}{4}$
  - (b)  $\frac{\pi}{3}$
  - (c)  $\frac{\pi}{2}$
  - (d) 0
15. The equation of normal to the curve

$$y = \log_e x$$

at the point  $P(1, 0)$  is:

- (a)  $2x + y = 2$
- (b)  $x - 2y = 1$
- (c)  $x - y = 1$
- (d)  $x + y = 1$