

MHT CET 2025 Memory Based Question Paper PDF (April 09, 2025) (Shift 1)

1. A wire of length L having Resistance R falls from a height h in Earth's horizontal magnetic field. What is the current through the wire?

- (a) $\frac{hB}{R}$
- (b) $\frac{hB^2}{R}$
- (c) $\frac{hB^2}{2R}$
- (d) $\frac{hB}{2R}$

2. Mass = (28 ± 0.01) g, Volume = (5 ± 0.1) cm³. What is the percentage error in density?

- (a) $\frac{2.25}{28}\%$
- (b) $\frac{3.57}{28}\%$
- (c) $\frac{1.25}{28}\%$
- (d) $\frac{4.5}{28}\%$

3. The value of g at height h above Earth's surface is $\frac{g}{\sqrt{3}}$. Find h in terms of the radius R of the Earth.

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

4. Given the voltage equation $V = 100\sqrt{2}\sin(\omega t)$ and capacitance $C = 2 \mu\text{F}$, calculate the RMS current.

- (a) 10 A
- (b) 20 A
- (c) 50 A
- (d) 100 A

5. The equation for the RMS velocity is given as

$$v_{\text{rms}} = \sqrt{\frac{3RT}{M_0}}$$

where R is the gas constant, T is the temperature, and M_0 is the molecular mass. If the temperature is increased, find the new RMS velocity v_{rms} when the temperature is doubled.

- (a) $\sqrt{3}v_{\text{rms}}$
- (b) $2v_{\text{rms}}$
- (c) $\sqrt{2}v_{\text{rms}}$
- (d) $\frac{v_{\text{rms}}}{\sqrt{2}}$

6. Two spherical black bodies radiate the same amount of heat per second. If their temperatures are T_1 and T_2 , and their radii are R_1 and R_2 , respectively, find the relation between their temperatures and radii.

- (a) $T_1 = \sqrt{2}T_2$
- (b) $T_1 = 2T_2$
- (c) $T_1 = \frac{T_2}{\sqrt{2}}$
- (d) $T_1 = \sqrt{3}T_2$

7. Energy stored in a capacitor is given by the equation

$$E = \frac{1}{2}CV^2$$

where: C is the capacitance, V is the voltage, and E is the energy stored. Given the values of C , V , and E , determine the energy stored.

- (a) $E = \frac{1}{2}CV^2$
 - (b) $E = CV$
 - (c) $E = CV^3$
 - (d) $E = \frac{1}{2}CV$
8. What is the ratio of the wavelength of the Lyman series limit to the Paschen series limit?
- (a) 1 : 4
 - (b) 1 : 3
 - (c) 2 : 3
 - (d) 1 : 2
9. What is the ratio of the wavelength of a photon?
- (a) $\lambda = \frac{h}{mv}$
 - (b) $\lambda = \frac{c}{f}$
 - (c) $\lambda = \frac{E}{h}$
 - (d) $\lambda = \frac{h}{E}$