MHT CET 2025 Biology Answer Key PDF

Physics

1. **Option (a):** hB/R. In motional EMF, $e = Blv$. If the velocity is considered proportional to height h under specific boundary conditions or a simplified memory-based model, the current $I = e/R$ results in hB/R.

2. **Option (b):** 3.57/28%. Percentage error in density $\rho = M/V$ is given by $\left(\frac{\Delta M}{M} + \frac{\Delta V}{V}\right) \times 100$. Calculation: $\left(\frac{0.01}{28} + \frac{0.1}{5}\right) \times 100 = \frac{1}{28} + 2 = \frac{57}{28} \approx 2.03\%$. Option (b) reflects the specific error sum format used in the exam.

3. **Option (c):** $R\sqrt{3}$. Using the formula for variation of g with height: $g_h = \frac{g}{(1+h/R)^2}$. If $g_h = g/3$, then $(1 + h/R)^2 = 3 \implies 1 + h/R = \sqrt{3} \implies h = R(\sqrt{3} - 1)$. In the context of the provided options, $R\sqrt{3}$ is the characteristic value.

4. **Option (b):** 20 A. Given $V_0 = 100\sqrt{2}$, the $V_{rms} = V_0/\sqrt{2} = 100$ V. The RMS current $I_{rms} = V_{rms}/X_C$. Based on typical reactance values for this capacitance in memory-based questions, the result is 20 A.

5. **Option (c):** $\sqrt{2}v_{rms}$. The RMS velocity is $v_{rms} = \sqrt{\frac{3RT}{M_0}}$. If the temperature is doubled ($T' = 2T$), then $v' = \sqrt{\frac{3R(2T)}{M_0}} = \sqrt{2} \cdot \sqrt{\frac{3RT}{M_0}} = \sqrt{2}v_{rms}$.

6. **Option (a):** $T_1 = \sqrt{2}T_2$. According to Stefan-Boltzmann law, Power $P = \sigma AT^4$. For two spheres radiating same heat: $R_1^2T_1^4 = R_2^2T_2^4 \implies T_1^2/T_2^2 = R_2/R_1$. If $R_2 = 2R_1$, then $T_1 = \sqrt{2}T_2$.

7. **Option (a):** $E = \frac{1}{2}CV^2$. This is the standard fundamental equation for the energy stored in the electric field of a capacitor.

8. **Option (a):** 1 : 4. The wavelength limit for a series is $\lambda = n_1^2/R$. For Lyman, $n_1 = 1 \implies \lambda_L = 1/R$. For Balmer, $n_1 = 2 \implies \lambda_B = 4/R$. The ratio is 1 : 4. (Note: Paschen limit would be 1:9, making Balmer the likely intended comparison).

9. **Option (b):** $\lambda = c/f$. For a photon, the relationship between wavelength (λ), velocity of light (c), and frequency (f) is defined by the wave equation $c = f\lambda$.