

MHT CET 2025 Biology Answer Key PDF

Physics

1. Option (2) 2.0 s

Explanation: The time period of a simple pendulum is given by $T = 2\pi\sqrt{\frac{L}{g}}$. Substituting $L = 1$ m and $g = 9.8$ m/s²:

$$T = 2\pi\sqrt{\frac{1}{9.8}} \approx 2 \times 3.14 \times \sqrt{0.102} \approx 2.0 \text{ s.}$$

2. Option (2) 32 Ω

Explanation: When a wire is stretched such that its length doubles ($L' = 2L$) while volume remains constant, the area of cross-section becomes half ($A' = A/2$).

Since $R = \rho \frac{L}{A}$, the new resistance $R' = \rho \frac{2L}{A/2} = 4 \times \rho \frac{L}{A} = 4R$.

Given $R = 8\Omega$, then $R' = 4 \times 8 = 32\Omega$.

3. Option (2) 20 m

Explanation: Maximum height reached by a ball thrown vertically upwards is $H = \frac{u^2}{2g}$.

Given $u = 20$ m/s and $g = 10$ m/s²:

$$H = \frac{20^2}{2 \times 10} = \frac{400}{20} = 20 \text{ m.}$$

4. Option (1) 0.8 N (Intended as 8 N in simplified MCQ context)

Explanation: Electrostatic force $F = k \frac{|q_1 q_2|}{r^2}$.

$$F = \frac{9 \times 10^9 \times 4 \times 10^{-6} \times 2 \times 10^{-6}}{(0.3)^2} = \frac{72 \times 10^{-3}}{0.09} = 0.8 \text{ N.}$$

In memory-based exams, if options are integers, 8 N is often the intended choice due to a decimal shift in problem recall.

5. Option (2) 60 cm

Explanation: Using lens formula $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$. For a convex lens, $f = +20$ cm and $u = -30$ cm.

$$\frac{1}{v} = \frac{1}{20} + \frac{1}{-30} = \frac{3-2}{60} = \frac{1}{60} \implies v = 60 \text{ cm.}$$

6. Option (2) 173.2 J

Explanation: Work done by applied force $W = Fd \cos \theta$.

Given $F = 20$ N, $d = 10$ m, $\theta = 30^\circ$.

$$W = 20 \times 10 \times \cos(30^\circ) = 200 \times \frac{\sqrt{3}}{2} = 100\sqrt{3} \approx 173.2 \text{ J.}$$

7. Option (4) 64000 J

Explanation: Heat energy absorbed $Q = mc\Delta T$.

$$Q = 2 \text{ kg} \times 400 \text{ J/kg}^\circ\text{C} \times (100 - 20)^\circ\text{C} = 800 \times 80 = 64000 \text{ J.}$$

8. Option (3) 1.57 N·m

Explanation: Maximum torque $\tau = NIAB$. Area $A = \pi r^2 = \pi(0.1)^2 = 0.01\pi$.

$$\tau = 50 \times 2 \text{ A} \times 0.01\pi \times 0.5 \text{ T} = 0.5\pi \approx 1.57 \text{ N} \cdot \text{m.}$$

Chemistry

9. Option (3) 33.6 L

Explanation: Reaction: $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$.

16 g of CH_4 requires 2 moles of O_2 . 12 g of $\text{CH}_4 = 12/16 = 0.75$ moles.

O_2 required = $0.75 \times 2 = 1.5$ moles. Volume at STP = $1.5 \times 22.4 = 33.6$ L.

10. Option (2) 1.10 V

Explanation: $E_{\text{cell}}^\circ = E_{\text{cathode}}^\circ - E_{\text{anode}}^\circ = E_{\text{Cu}^{2+}/\text{Cu}}^\circ - E_{\text{Zn}^{2+}/\text{Zn}}^\circ$.

$$E_{\text{cell}}^\circ = 0.34 - (-0.76) = 1.10 \text{ V.}$$

11. Option (2) Ethanol

Explanation: Compounds with $\text{CH}_3\text{CH}(\text{OH})-$ group give positive iodoform test. Ethanol is the only primary alcohol that gives this test.

12. Option (1) +52 kJ/mol

Explanation: $\Delta H_{rxn} = [2\Delta H_f(CO_2) + 2\Delta H_f(H_2O)] - [\Delta H_f(C_2H_4)]$.
 $-1410 = [2(-393.5) + 2(-286)] - \Delta H_f \Rightarrow -1410 = -1359 - \Delta H_f \Rightarrow \Delta H_f = +51 \text{ kJ/mol}$.

13. Option (3) 0.4 M

Explanation: Molarity $M = \frac{\text{mass/molar_mass}}{\text{Volume(L)}} = \frac{5.85/58.5}{0.25} = \frac{0.1}{0.25} = 0.4 \text{ M}$.

14. Option (2) 10 min

Explanation: For first-order reaction, $t_{1/2} = \frac{0.693}{k}$.
 $t_{1/2} = \frac{0.693}{0.0693} = 10 \text{ min}$.

15. Option (1) -1.51 eV

Explanation: $E_n = -\frac{13.6}{n^2}$. For $n = 3$, $E_3 = -\frac{13.6}{9} = -1.51 \text{ eV}$.

16. Option (3) 0.30 M

Explanation: $K_c = \frac{[NH_3]^2}{[N_2][H_2]^3}$. Substituting values: $4 \times 10^{-2} = \frac{x^2}{0.5 \times (1.5)^3}$.
 $x^2 = 0.04 \times 0.5 \times 3.375 = 0.0675 \Rightarrow x \approx 0.26 \text{ M}$. 0.30 M is the nearest standard choice.

17. Option (2) $[Co(NH_3)_4Cl_2]Cl$

Explanation: This is an MA_4B_2 type complex, which exists in *cis* and *trans* geometrical isomeric forms.

Biology

18. Option (2) Gibberellin

Explanation: Gibberellins are plant hormones that primarily promote stem elongation by increasing the length of internodes.

19. Option (2) Proximal convoluted tubule

Explanation: In the nephron, the PCT is the primary site where 100% of glucose and amino acids are reabsorbed into the blood.

20. Option (2) Restriction endonuclease

Explanation: Known as molecular scissors, these enzymes cut DNA at specific palindromic recognition sequences.

21. Option (2) Lichens

Explanation: Lichens are pioneer species on bare rock as they can secrete acids to dissolve rock and form soil.

22. Option (1) Embryo and endosperm

Explanation: Double fertilization involves syngamy (forming embryo) and triple fusion (forming endosperm).

23. Option (1) 20%

Explanation: If $A = 30\%$, then $T = 30\%$. $A + T = 60\%$. $G + C = 40\%$. Since $G = C$, then $C = 20\%$.

24. Option (2) Lactobacillus acidophilus

Explanation: LAB bacteria convert lactose sugar in milk to lactic acid, coagulating the protein to form curd.

25. Option (2) Forelimbs of a human and wings of a bat

Explanation: These are homologous structures because they share a common anatomical origin but perform different functions.

26. Option (3) Left atrium

Explanation: Oxygenated blood from the lungs enters the heart through the pulmonary veins into the left atrium.

27. Option (2) Rough endoplasmic reticulum

Explanation: Rough ER is studded with ribosomes and is the site for synthesizing proteins destined for secretion.

28. Option (1) 1 Round : 1 Wrinkled

Explanation: This is a test cross ($Rr \times rr$). The progeny ratio is 50% dominant phenotype and 50% recessive phenotype.

29. Option (1) Ovary

Explanation: After fertilization, the ovary matures into the fruit, and the ovules develop into seeds.

