

MHT CET 2026 Mathematics Answer Key PDF

Mathematics

1. Option (a) $p = T, q = T, r = F, s = T$

Explanation: For the implication $(p \wedge q) \rightarrow (r \vee \neg s)$ to be false, the antecedent $(p \wedge q)$ must be true (so $p = T$ and $q = T$) and the consequent $(r \vee \neg s)$ must be false (so $r = F$ and $\neg s = F \implies s = T$).

2. Option (b) 2

Explanation: For continuity at $x = \pi/2$, the limit of the function as $x \rightarrow \pi/2$ must equal its defined value. Applying L'Hôpital's rule to the limit gives $\lim_{x \rightarrow \pi/2} \frac{-k \sin x}{-2} = \frac{k}{2}$, and setting this equal to a standard functional value of 1 yields $k = 2$.

3. Option (d) $\frac{\hat{i} + 7\hat{j} + 5\hat{k}}{5\sqrt{3}}$

Explanation: The vector perpendicular to both $\vec{a}$ and $\vec{b}$ is given by their cross product, which is $\vec{a} \times \vec{b} = \hat{i} + 7\hat{j} + 5\hat{k}$. Dividing this vector by its magnitude, $|\vec{a} \times \vec{b}| = \sqrt{75} = 5\sqrt{3}$, gives the unit vector.

4. Option (b) $\frac{\pi}{4}$

Explanation: Applying King's property of definite integrals, $\int_0^a f(x)dx = \int_0^a f(a-x)dx$, the integrand's numerator converts to $\cos^n x$. Adding the original and transformed integrals yields $2I = \int_0^{\pi/2} 1 dx = \frac{\pi}{2} \implies I = \frac{\pi}{4}$.

5. Option (a) $\frac{3-12x^2}{\sqrt{1-(3x-4x^3)^2}}$

Explanation: Differentiating the function $y = \sin^{-1}(u)$ where $u = 3x - 4x^3$ using the chain rule gives $\frac{dy}{dx} = \frac{1}{\sqrt{1-u^2}} \frac{du}{dx}$. Substituting $\frac{du}{dx} = 3 - 12x^2$ directly produces the expression in Option (a).

Physics

6. Option (c) 12.5 m/s^2

Explanation: The centripetal acceleration of a particle moving in a circular path is given by the formula $a_c = v^2/r$. Substituting the constant velocity $v = 5 \text{ m/s}$ and circular radius $r = 2 \text{ m}$ gives $a_c = 25/2 = 12.5 \text{ m/s}^2$.

7. Option (b) 2 m/s^2

Explanation: According to Newton's second law of motion, the acceleration of an object is directly proportional to the applied net force and inversely proportional to its mass, $a = F/m$. Substituting $F = 10 \text{ N}$ and $m = 5 \text{ kg}$ yields $a = 2 \text{ m/s}^2$.

8. Option (c) 2.01 s

Explanation: The time period of a simple pendulum is given by $T = 2\pi\sqrt{L/g}$. Substituting the pendulum length $L = 1 \text{ m}$ and gravitational acceleration $g = 9.8 \text{ m/s}^2$ gives $T = 2\pi\sqrt{1/9.8} \approx 2.01 \text{ s}$.

9. Option (a) $\sqrt{gL}$

Explanation: At the topmost point of a vertical circle, the tension in the string must be greater than or equal to zero for the string to remain taut. Setting $T = \frac{mv^2}{L} - mg \geq 0$ gives the minimum speed $v = \sqrt{gL}$.

10. Option (b) C

Explanation: In an infinite repeating capacitor network, the overall equivalent capacitance remains unchanged when one section is removed. Setting up the equation $1/X = 1/C + 1/X$ shows that the infinite network behaves identically to a single capacitor of capacitance C .

Chemistry

11. Option (b) 2,4,6-Tribromophenol

Explanation: Phenol is highly reactive towards electrophilic aromatic substitution due to the strong activating effect of the hydroxyl group. It reacts with bromine water to undergo rapid bromination at all active ortho and para positions, yielding a white precipitate of 2,4,6-tribromophenol.

12. Option (a) 3-Hydroxybutanal

Explanation: Numbering the carbon chain of the compound begins at the principal aldehyde group (C_1). This places the substituent hydroxyl group on the third carbon (C_3), leading to the systematic IUPAC name 3-hydroxybutanal.

13. Option (b) Concentrated HCl and $ZnCl_2$

Explanation: The Lucas reagent consists of a mixture of concentrated hydrochloric acid and anhydrous zinc chloride. It distinguishes primary, secondary, and tertiary alcohols based on the distinct rate at which they form a turbid solution of alkyl chlorides.

14. Option (b) Coordination number = 6, Oxidation state = +3

Explanation: In $[Co(NH_3)_6]Cl_3$, cobalt is coordinated to six neutral ammine ligands, giving a coordination number of 6. Setting up the oxidation state equation $x + 6(0) + 3(-1) = 0$ yields the oxidation state of cobalt as +3.

15. Option (a) 2.46 atm

Explanation: Osmotic pressure is calculated using the formula $\pi = CRT$. Substituting the molar concentration $C = 0.1$ M, gas constant $R = 0.0821$ L atm mol⁻¹ K⁻¹, and absolute temperature $T = 300$ K gives $\pi \approx 2.46$ atm.