

# MHT CET 2026 Mathematics Answer Key PDF

## Physics

- Option (a)  $\frac{5}{6}r$   
Explanation: For a skeletal cube formed by 12 identical wires of resistance  $r$ , the equivalent resistance across the diagonally opposite corners (body diagonal) is determined by nodal symmetry to be  $\frac{5}{6}r$ .
- Option (a) Attractive, magnitude  $\frac{\mu_0 e I v}{2\pi d}$   
Explanation: The magnetic field created by the wire points into the page, and the moving proton is subject to a magnetic force  $\vec{F} = e(\vec{v} \times \vec{B})$ . This force is attractive (towards the wire) and has a magnitude of  $\frac{\mu_0 e I v}{2\pi d}$ .
- Option (a) 4 : 1  
Explanation: Since the wire is rewound into a coil of half the radius, the number of turns doubles ( $N_2 = 2N$ ). Substituting these values into the magnetic field formula  $B = \frac{\mu_0 N I}{2R}$  shows that the field at the center increases by a factor of 4.
- Option (d)  $\frac{5}{8}MR^2$   
Explanation: The moment of inertia of a uniform flat annular disc of outer radius  $R$  and inner radius  $R/2$  about its central perpendicular axis is  $I = \frac{1}{2}M(R^2 + (R/2)^2)$ , which simplifies directly to  $\frac{5}{8}MR^2$ .
- Option (b)  $2R/5$   
Explanation: Equating the angular impulse about the center of mass to the moment of inertia times the angular velocity for pure rolling ( $v_0 = R\omega_0$ ) yields  $(Mv_0)h = \frac{2}{5}MR^2 \left(\frac{v_0}{R}\right)$ , which simplifies to  $h = \frac{2}{5}R$ .

## Chemistry

- Option (b) Alcohols  
Explanation: Ethers and monohydric alcohols share the same general molecular formula  $C_nH_{2n+2}O$ . Consequently, they are classified as functional isomers of each other.
- Option (b) 413.14  
Explanation: The magnitude of the work done during a reversible isothermal process is given by  $W = -2.303nRT \log_{10}(P_1/P_2)$ . Substituting  $n = 1$ ,  $R = 2.0 \text{ cal/mol} \cdot \text{K}$ ,  $T = 298.15 \text{ K}$ , and the pressures yields 413.14 cal.
- Option (d) Te and Se  
Explanation: In Group 16, oxygen and sulfur are non-metals, polonium is a radioactive metal, and selenium (Se) and tellurium (Te) exhibit properties of both metals and non-metals, classifying them as metalloids.
- Option (b)  $Ti^{4+}$   
Explanation: The titanium ion  $Ti^{4+}$  has a completely empty  $3d$  subshell ( $3d^0$  electronic configuration). Since  $d-d$  electronic transitions are not possible, the ion is entirely colourless in aqueous solution.
- Option (a) FCC  
Explanation: Silver (Ag) is a transition metal that crystallizes in a face-centered cubic (FCC) structure (also known as cubic close-packed, CCP), which is a highly efficient close-packed lattice arrangement.

## Mathematics

11. Option (b)  $\frac{5}{3}$

Explanation: Letting  $z = x + iy$  and equating the real and imaginary parts of  $\sqrt{x^2 + y^2} + x + iy = 3 + i$  gives  $y = 1$  and  $x = 4/3$ . Calculating the modulus  $|z| = \sqrt{(4/3)^2 + 1^2}$  yields the value  $\frac{5}{3}$ .

12. Option (c) A contradiction

Explanation: The negation of a conditional statement  $A \rightarrow B$  is  $A \wedge \sim B$ . Simplifying  $(p \wedge \sim q) \wedge \sim (p \vee \sim q)$  using De Morgan's laws leads to  $(p \wedge \sim p) \wedge (q \wedge \sim q) \equiv F$ , which is a contradiction.

13. Option (a)  $\frac{8}{3}$

Explanation: According to the Cayley-Hamilton theorem,  $A$  satisfies its characteristic equation  $A^2 - 5A + 6I = O$ . Multiplying by  $A^{-1}$  gives  $A^{-1} = \frac{5}{6}I - \frac{1}{6}A$ , so  $4(\alpha + \beta) = 4\left(\frac{5}{6} - \frac{1}{6}\right) = \frac{8}{3}$ .

14. Option (a)  $-\frac{x}{(1-x^2)^{3/2}}$

Explanation: Differentiating  $y = \cos^{-1} x$  once gives  $\frac{dy}{dx} = -(1-x^2)^{-1/2}$ . Differentiating a second time with respect to  $x$  using the power rule and chain rule yields  $\frac{d^2y}{dx^2} = -\frac{x}{(1-x^2)^{3/2}}$ .

15. Option (a)  $2x - \frac{7}{2} \log |2x + 1| + C$

Explanation: Dividing the numerator by the denominator, we can rewrite the integrand as  $2 - \frac{7}{2x+1}$ . Integrating each term term-by-term with respect to  $x$  yields  $2x - \frac{7}{2} \log |2x + 1| + C$ .