

# MHT CET 2026 Mathematics Answer key PDF

## Physics

1. **Option (a)**  $\frac{5}{6}r$

**Explanation:**

The equivalent resistance across the body-diagonal corners of a symmetrical cube skeleton consisting of twelve identical resistors each of resistance  $r$  is standardly given by  $R_{eq} = \frac{5}{6}r$ .

2. **Option (a) Attractive, magnitude**  $\frac{\mu_0 e I v}{2\pi d}$

**Explanation:**

The magnetic field is  $B = \frac{\mu_0 I}{2\pi d}$ . Applying the right-hand rule for  $\vec{F} = e(\vec{v} \times \vec{B})$  shows the force on the positive proton points toward the wire (attractive) with magnitude  $F = \frac{\mu_0 e I v}{2\pi d}$ .

3. **Option (a)** 4 : 1

**Explanation:**

Unwinding and rewinding to half the radius doubles the turns ( $N' = 2N$ ). The magnetic field at the center of the coil is  $B \propto N/R \implies B'/B = (N'/N) \times (R/R') = 2 \times 2 = 4 \implies 4 : 1$ .

4. **Option (a)**  $\frac{15}{32}MR^2$

**Explanation:**

Subtracting the moment of inertia of the inner concentric cut-out portion of mass  $M/4$  and radius  $R/2$  ( $\frac{1}{32}MR^2$ ) from the complete solid disc of radius  $R$  ( $\frac{1}{2}MR^2$ ) yields  $I = \frac{15}{32}MR^2$ .

5. **Option (b)**  $2R/5$

**Explanation:**

Equating linear impulse ( $J = Mv_c$ ) and angular impulse about the center of mass ( $J \cdot h = I\omega = \frac{2}{5}MR^2\omega$ ) while applying the rolling condition  $v_c = R\omega$  yields the height  $h = \frac{2}{5}R$ .

## Chemistry

6. **Option (b) Alcohols**

**Explanation:**

Monohydric alcohols and ethers share the same general molecular formula  $C_nH_{2n+2}O$ , making them functional group isomers of one another.

7. **Option (b)** 413.14

**Explanation:**

The work done during a reversible isothermal process is  $W = -nRT \ln(P_1/P_2)$ . Substituting the given values yields  $W = -(1)(2.0)(298.15) \ln(0.5/1.0) \approx 413.14$  calories.

8. **Option (d) Te and Se**

**Explanation:**

Oxygen, sulfur, and selenium are non-metals (with selenium showing some intermediate properties), while tellurium and selenium are classified as metalloids, and polonium is a radioactive metal.

9. **Option (b)  $Ti^{4+}$**

**Explanation:**

The titanium ion  $\text{Ti}^{4+}$  has an electronic configuration of  $[\text{Ar}]3d^0$ . Since there are no electrons in the  $d$ -orbitals,  $d$ - $d$  transition is not possible, making the ion colorless.

10. **Option (a) FCC**

**Explanation:**

Silver (Ag) crystallizes in a face-centered cubic (FCC) crystal structure, which is also referred to as a cubic close-packed (CCP) lattice.

## Mathematics

11. **Option (b)  $5/3$**

**Explanation:**

Letting  $z = x + iy$ , equating imaginary parts gives  $y = 1$ . Equating real parts yields  $\sqrt{x^2 + 1} + x = 3 \implies x = 4/3$ , which gives the magnitude  $|z| = \sqrt{(4/3)^2 + 1^2} = 5/3$ .

12. **Option (c) A contradiction**

**Explanation:**

Since  $p \wedge \sim q \implies p \implies p \vee \sim q$ , the conditional statement  $(p \wedge \sim q) \rightarrow (p \vee \sim q)$  is a tautology. Therefore, its negation is a contradiction.

13. **Option (a)  $8/3$**

**Explanation:**

By the Cayley-Hamilton theorem,  $A^2 - 5A + 6I = O \implies A^{-1} = \frac{5}{6}I - \frac{1}{6}A$ . Comparing this with  $\alpha I + \beta A$  gives  $\alpha = 5/6$  and  $\beta = -1/6$ , so  $4(\alpha + \beta) = 4(4/6) = 8/3$ .

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 via the chain rule yields  $\frac{d^2y}{dx^2} = -\frac{1}{2}(1-x^2)^{-3/2}(-2x) = -\frac{x}{(1-x^2)^{3/2}}$ .

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

**Explanation:**

Rewriting the numerator as  $4x - 5 = 2(2x + 1) - 7$  transforms the integral to  $\int \left(2 - \frac{7}{2x+1}\right) dx$ . Integrating this directly gives  $2x - \frac{7}{2} \log |2x + 1| + C$ .