

MHT CET 2026 Mathematics Memory Based Question Paper PDF

Mathematics

1. If a polygon has 54 diagonals, find the number of sides of the polygon.
 - (a) 10
 - (b) 11
 - (c) 12
 - (d) 15
2. If $y = \cos^{-1} x$, find $\frac{d^2 y}{dx^2}$ in terms of y .
 - (a) $-\csc^2 y \cot y$
 - (b) $\csc^2 y \cot y$
 - (c) $-\csc y \cot^2 y$
 - (d) $\csc y \cot^2 y$
3. If $A = \begin{bmatrix} 4 & 5 \\ 2 & 1 \end{bmatrix}$, find A^{-1} .
 - (a) $\begin{bmatrix} 1/6 & -5/6 \\ -1/3 & 2/3 \end{bmatrix}$
 - (b) $\begin{bmatrix} -1/6 & 5/6 \\ 1/3 & -2/3 \end{bmatrix}$
 - (c) $\begin{bmatrix} -1 & 5 \\ 2 & -4 \end{bmatrix}$
 - (d) $\begin{bmatrix} 4 & -5 \\ -2 & 1 \end{bmatrix}$
4. If $\int x^3 e^x dx = e^x(px^3 + qx^2 + rx + s) + C$, then find the value of $p + q + r + s$.
 - (a) -2
 - (b) 0
 - (c) 1
 - (d) 6
5. Find the distance between the point $2\hat{i} + \hat{j} - \hat{k}$ and the plane $\vec{r} \cdot (\hat{i} - 2\hat{j} + 4\hat{k}) = 9$.
 - (a) $\frac{13}{\sqrt{21}}$
 - (b) $\frac{9}{\sqrt{21}}$
 - (c) $\frac{13}{21}$
 - (d) $\frac{21}{\sqrt{13}}$

6. If the scalar triple product of three vectors $\vec{a}, \vec{b}, \vec{c}$ is given as $[\vec{a} \vec{b} \vec{c}] = 3$, then find the value of the scalar triple product of their cross products, denoted as $[\vec{a} \times \vec{b} \vec{b} \times \vec{c} \vec{c} \times \vec{a}]$.

- (a) 3
- (b) 6
- (c) 9
- (d) 27

7. Evaluate the indefinite integral:

$$\int \frac{x^3 \sin[\tan^{-1}(x^4)]}{1+x^8} dx$$

- (a) $\frac{1}{4} \cos[\tan^{-1}(x^4)] + C$
- (b) $-\frac{1}{4} \cos[\tan^{-1}(x^4)] + C$
- (c) $\frac{1}{4} \sin[\tan^{-1}(x^4)] + C$
- (d) $-\frac{1}{4} \sin[\tan^{-1}(x^4)] + C$

8. If $A = \begin{bmatrix} 1 & -2 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$, find the value of the matrix expression $A(I + \text{adj } A)$, where I is the identity matrix of the same order as A .

- (a) $\begin{bmatrix} 8 & -2 & 2 \\ 0 & 8 & -3 \\ 3 & -2 & 8 \end{bmatrix}$
- (b) $\begin{bmatrix} 9 & -2 & 2 \\ 0 & 10 & -3 \\ 3 & -2 & 12 \end{bmatrix}$
- (c) $\begin{bmatrix} 1 & -16 & 16 \\ 0 & 16 & -24 \\ 24 & -16 & 32 \end{bmatrix}$
- (d) $\begin{bmatrix} 9 & 0 & 0 \\ 0 & 10 & 0 \\ 0 & 0 & 12 \end{bmatrix}$

9. Evaluate the indefinite integral:

$$\int e^x (\sin x + \cos x) dx$$

- (a) $e^x \cos x + C$
- (b) $e^x \sin x + C$
- (c) $-e^x \sin x + C$
- (d) $e^x (\sin x - \cos x) + C$

10. In $\triangle ABC$, if $\angle C = \frac{2\pi}{3}$, then the value of $\cos^2 A + \cos^2 B - \cos A \cos B$ is:

- (a) $\frac{1}{2}$
- (b) $\frac{3}{4}$
- (c) 1
- (d) $\frac{3}{2}$

Chemistry

11. Which of the following compounds is NOT in the gaseous phase at 25°C?
- (a) ClF
 - (b) BrF
 - (c) IF₃
 - (d) ClF₃
12. A solution is prepared by dissolving 2 g of a non-volatile solute in 500 mL of solution at 27°C. The osmotic pressure of the solution is 0.82 atm. The molar mass of the solute is:
- (a) 100 g mol⁻¹
 - (b) 120 g mol⁻¹
 - (c) 150 g mol⁻¹
 - (d) 180 g mol⁻¹
13. What is the oxidation state of sulfur in Marshall's acid (H₂S₂O₈)?
- (a) +4
 - (b) +5
 - (c) +6
 - (d) +7
14. Oil of wintergreen is chemically known as:
- (a) Methyl acetate
 - (b) Methyl salicylate
 - (c) Ethyl salicylate
 - (d) Salicylic acid
15. Which of the following does not belong to Group 16 elements?
- (a) Oxygen
 - (b) Sulfur
 - (c) Selenium
 - (d) Chlorine