MHT CET 2026 May 18 Shift 1

Question Paper (Memory-Based)

Conducted by Maharashtra State CET Cell

General Instructions

(i) **Duration:** The total duration of the examination is 3 hours (180 minutes).

(ii) **Total Marks:** The complete paper carries a maximum of 200 marks.

(iii) **Structure:** The paper has 3 Sections:

- **Section A:** 50 Multiple Choice Questions (Physics)
- **Section B:** 50 Multiple Choice Questions (Chemistry)
- **Section C:** 50 Multiple Choice Questions (Mathematics)

(iv) **Compulsory Questions:** All 150 questions are compulsory.

(v) Each question has four options. Only **one** option is correct.

(vi) **Right Answer:** +1 marks for Physics and Chemistry Questions. +2 marks for Mathematics Questions

(vii) **Incorrect Answer:** (No Negative marking).

(viii) **Unanswered/Marked for Review:** 0 marks.

1. If a polygon has 54 diagonals, find the number of sides of the polygon.

(A) 10

(B) 11

(C) 12

(D) 15

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2. If $y = \cos^{-1} x$, find $\frac{d^2y}{dx^2}$ in terms of y.

(A) $-\csc^2 y \cot y$

(B) $\csc^2 y \cot y$

(C) $-\csc y \cot^2 y$

(D) $\csc y \cot^2 y$

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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) $\begin{bmatrix} 4 & -5 \\ -2 & 1 \end{bmatrix}$

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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

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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) $\frac{21}{\sqrt{13}}$

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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 $[\vec{a} \times \vec{b} \quad \vec{b} \times \vec{c} \quad \vec{c} \times \vec{a}]$.

(A) 3

(B) 6

(C) 9

(D) 27

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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) $-\frac{1}{4}\sin[\tan^{-1}(x^4)] + C$

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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) $e^x(\sin x - \cos x) + C$

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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) $\frac{3}{2}$

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11. Which of the following compounds is NOT in the gaseous phase at 25°C?

(A) ClF

(B) BrF

(C) IF_3

(D) ClF_3

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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) $100\,\text{g mol}^{-1}$

$(B) 120\,\text{g mol}^{-1}$

$(C) 150\,\text{g mol}^{-1}$

$(D) 180\,\text{g mol}^{-1}$

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13. What is the oxidation state of sulfur in Marshall's acid ($H_2S_2O_8$)?

(A) +4

(B) +5

(C) +6

(D) +7

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14. Oil of wintergreen is chemically known as:

(A) Methyl acetate

(B) Methyl salicylate

(C) Ethyl salicylate

(D) Salicylic acid

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15. Which of the following does not belong to Group 16 elements?

(A) Oxygen

(B) Sulfur

(C) Selenium

(D) Chlorine
