

MHT CET 2026 May 21 Shift 1 PCM

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 $\sin x \cos x = \frac{1}{4}$, then the general solution is:

- (A) $\frac{n\pi}{2} + (-1)^n \frac{\pi}{12}$
- (B) $\frac{n\pi}{2} + \frac{\pi}{4}$
- (C) $n\pi \pm \frac{\pi}{6}$
- (D) $\frac{n\pi}{2} + (-1)^n \frac{\pi}{6}$

2. If $n \in \mathbb{Z}$, then the expression

$$\frac{2^n}{(1-i)^{2n}} + \frac{(1+i)^{2n}}{2^n}$$

is equal to:

- (A) $2(-1)^n$
 - (B) 0
 - (C) 2
 - (D) 2^n
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3. The value of

$$\int \frac{x^2 - 1}{(x^4 + 3x^2 + 1) \tan^{-1}\left(x + \frac{1}{x}\right)} dx$$

is:

- (A) $\log \left| \tan^{-1}\left(x + \frac{1}{x}\right) \right| + C$
 - (B) $\tan^{-1}\left(x + \frac{1}{x}\right) + C$
 - (C) $-\log \left| \tan^{-1}\left(x + \frac{1}{x}\right) \right| + C$
 - (D) $\frac{1}{2} \log \left| x + \frac{1}{x} \right| + C$
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4. If

$$f(x) = \int \frac{x^2}{(1-x^2)(1+\sqrt{1-x^2})} dx$$

and $f(0) = 2$, then $f\left(\frac{1}{2}\right)$ is:

- (A) $2 + \frac{1}{2} \log 3 - \frac{\sqrt{3}}{2}$
 - (B) $2 + \log 3 - \sqrt{3}$
 - (C) $2 + \sqrt{3} - \log 3$
 - (D) $2 + \frac{\sqrt{3}}{2} - \frac{1}{2} \log 3$
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5. If

$$A = \begin{bmatrix} \sin \alpha & -\cos \alpha \\ \cos \alpha & \sin \alpha \end{bmatrix}$$

and $\alpha \in \left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$. If $A + A^T = I$, then $\alpha =$

- (A) $\frac{2\pi}{3}$
(B) $\frac{5\pi}{6}$
(C) $\frac{\pi}{3}$
(D) $\frac{4\pi}{3}$
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6. The range of the function

$$y = \log(\sin x)$$

where $\sin x > 0$ is:

- (A) $[0, \infty)$
(B) $(-\infty, 0]$
(C) $(-\infty, \infty)$
(D) $[-1, 1]$
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7. Let $f(x)$ be defined by:

$$f(x) = \begin{cases} \int_x^6 (|t-2| + 3) dt, & x > 4 \\ 2x + 8, & x \leq 4 \end{cases}$$

Then at $x = 4$, $f(x)$ is:

- (A) Continuous but not differentiable
(B) Differentiable
(C) Discontinuous
(D) None of these
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8. If

$$y = (x-1)(x-2)(x-3)\cdots(x-100)$$

and the value of $\frac{dy}{dx}$ at $x = 0$ is equal to

$$\lambda \left(\frac{100!}{{}^{100}C_5} \right)$$

then λ is:

- (A) $\frac{1}{120}$
 - (B) 120
 - (C) 1
 - (D) $\frac{1}{24}$
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9. Let

$$\vec{a} = \hat{i} + \hat{j} + \hat{k}$$

$$\vec{b} = \hat{i} - \hat{j} + 2\hat{k}$$

If a vector \vec{c} is coplanar with \vec{a} and \vec{b} such that

$$\vec{c} \cdot \vec{a} = 1$$

and

$$\vec{c} \cdot \vec{b} = 2$$

then \vec{c} is:

- (A) $\frac{1}{3}(-\hat{i} + 5\hat{j} + 3\hat{k})$
 - (B) $\frac{1}{3}(5\hat{i} - \hat{j} + 3\hat{k})$
 - (C) $\hat{i} - \hat{j} + \hat{k}$
 - (D) $\frac{1}{2}(\hat{j} + \hat{k})$
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10. If n is an odd natural number and

$$I_n = \int_0^1 e^x (x-1)^n dx$$

then $I_n + nI_{n-1}$ is equal to:

- (A) 1
 - (B) -1
 - (C) e
 - (D) 0
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