O.P. JINDAL SCHOOL, SAVITRI NAGAR

Periodic Test-1 (Round 2) - 2026-2027

Class: XII Sci. **MM:20**

Subject: Mathematics **Time :1Hour**

General Instructions:

i) All questions are compulsory.
ii) Question no. 1 to 5 carries 1 mark each, question no. 6 to 8 carries 2 marks each, question no. 9 to 11 carries 3 marks each.
iii) There is no overall choice. However, internal choice has been provided.

SECTION A

1.) The principal value of $\cos^{-1}\left(\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{\sqrt{2}}\right)$ is

a) $\frac{\pi}{12}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{6}$ d) π

2.) For what value of k, the matrix $\begin{bmatrix} k & 2 \\ 3 & 4 \end{bmatrix}$ has no inverse

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

3.) If A is a square matrix of order 3 x 3 such that A.(Adj A) = 10I, then | Adj A| is

a) 1 b) 10 c) 100 d) 1000

4.) The number of point(s) where $f(x) = |x + 2| + |x - 3|$ is not differentiable is/are

a) 2 b) 3 c) 0 d) 1

5.) If $y = Ae^{5x} + Be^{-5x}$, then $\frac{d^2y}{dx^2}$ is equal to

a) 25y b) 5y c) -25y d) 25

SECTION B

6.) Find $\frac{dy}{dx}$, if $y = x^{\sin x}$.

7.) Prove that $3\sin^{-1}x = \sin^{-1}(3x - 4x^3)$, $x \in \left[-\frac{1}{2}, \frac{1}{2}\right]$.

OR

Find the value of $\sin^{-1}\left[\sin\left(-\frac{17\pi}{8}\right)\right]$.

8.) If area of triangle with vertices (k, 0), (1, 1) and (0, 3) is 5 sq. units, then find the value of k .

SECTION C

9.) Prove that $\tan^{-1}\frac{3}{5} + \tan^{-1}\frac{1}{4} = \frac{\pi}{4}$.

10.) If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ be such that $A^{-1} = kA$, then find the value of k.

OR

If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, using $A^2 - 5A + 7I = \boldsymbol{0}$ find A^{-1}.

11.) Determine the value of k for which the following function is continuous at x = 3:

$$f(x) = \begin{cases} \dfrac{(x+3)^2 - 36}{x-3}, & x \neq 3 \\ k, & x = 3. \end{cases}$$

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