MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 9

Total Marks : 28

Max. Time : 30 min.

Topics : Inverse Trigonometric Function, Matrices, Fundamentals of Mathematics

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q. 1, 2, 3, 4, 5, 6	**(3 marks, 3 min.)**	**[12, 12]**
Subjective Questions (no negative marking) Q. 7	**(4 marks, 5 min.)**	**[8, 10]**
Match the Following (no negative marking) Q.8	**(8 marks, 8 min.)**	**[8, 8]**

1. Value of $\cos^{-1}(\cos 12) - \sin^{-1}(\sin 12)$ is

(A) 0 (B) π (C) $8\pi - 24$ (D) $8\pi - 32$

2. Find the value of θ where $\theta = \sin^{-1}\sqrt{\frac{2-\sqrt{3}}{4}} + \cos^{-1}\frac{\sqrt{12}}{4} + \sec^{-1}(\sqrt{2})$

(A) 0 (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{2}$

3. If matrix $A = [a_{ij}]_{3\times3}$, matrix $B = [b_{ij}]_{3\times3}$ where $a_{ij} + a_{ji} = 0$ and $b_{ij} - b_{ji} = 0$, then $A^4 \cdot B^3$ is

(A) skew-symmetric matrix (B) singular

(C) symmetric (D) zero matrix

4. If $A = [a_{ij}]_{3\times3}$, such that $a_{ij} = \begin{cases} 2 & , \ i = j \\ 0 & , \ i \neq j \end{cases}$, then $1 + \log_{1/2}(|A|^{|\text{adj } A|})$ is equal to

(A) –191 (B) –23 (C) 0 (D) does not exists

5. If $A = \begin{bmatrix} 1 & 2 & 0 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$, then det (Adj (Adj A)) =

(A) 13 (B) 13^2 (C) 13^4 (D) none of these

6. The polynomial $P(x) = x^3 + ax^2 + bx + c$ has the property that the mean of its zeros, the product of its zeros, and the sum of its coefficients are all equal. If the y-intercept of the graph of $y = P(x)$ is 2, then the value of b is

(A) – 9 (B) 5 (C) – 11 (D) 1

7. We call 'a' a good number if the inequality $\frac{2x^2+2x+3}{x^2+x+1} \leq a$ is satisfied for some real values of x.

(a) Prove that 4 is a good number. (b) Find all good numbers.

8. **Match the column**

Column – I		**Column – II**	
[.] and {.} represent the greatest integer and fractional part functions respectively.			
(a)	Number of solutions of $[x] = \cos^{-1}x$	(P)	3
(b)	Number of solutions of $\sin^{-1}x = \text{sgn}(x)$	(Q)	2
(c)	Number of solutions of $\{x\} = e^{x^2}$	(R)	1
(d)	Number of solutions of $\frac{\sin^{-1}x + \cos^{-1}x}{2} = \{x\}$	(S)	0

Answers Key

1. (C) **2.** (D) **3.** (B) **4.** (A)

5. (C) **6.** (C) **7.** (b) For all $a \in (2, \infty)$

8. (a) $\rightarrow$ (S), (b) $\rightarrow$ (P), (c) $\rightarrow$ (S), (d) $\rightarrow$ (Q)