MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 8

Total Marks : 32

Max. Time : 32 min.

Topics : Matrices, Fundamentals of Mathematics, Inverse Trigonometric Function

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1, 2, 3, 4, 5	**(3 marks, 3 min.)**	**[15, 15]**
Multiple choice objective (no negative marking) Q.6	**(5 marks, 4 min.)**	**[5, 4]**
Subjective Questions (no negative marking) Q. 7	**(4 marks, 5 min.)**	**[4, 5]**
Match the Following (no negative marking) Q.8	**(8 marks, 8 min.)**	**[8, 8]**

1. The matrix A has x rows and (x + 5) columns. The matrix B has y rows and (11 – y) columns. Both AB and BA exist. The values of x and y are

(A) 8, 3 (B) 3, 4 (C) 3, 8 (D) 8, 8

2. If the matrix X satisfies the equation $\begin{bmatrix} 1 & -2 \\ 4 & 3 \end{bmatrix} + 2X = \begin{bmatrix} 2 & 1 & -2 \\ 0 & 1 & 3 \end{bmatrix} \begin{bmatrix} 3 & 2 \\ 1 & 4 \\ -3 & 1 \end{bmatrix}$, then 'X' equals

(A) $\begin{bmatrix} 6 & 4 \\ -6 & 2 \end{bmatrix}$ (B) $\begin{bmatrix} 6 & 4 \\ -6 & 3 \end{bmatrix}$ (C) $\begin{bmatrix} 6 & 2 \\ -6 & 3 \end{bmatrix}$ (D) $\begin{bmatrix} 7 & 2 \\ -2 & 5 \end{bmatrix}$

3. Let $A = \begin{bmatrix} x^2 & 1 & 0 \\ 2 & 2x & -1 \\ 4 & 5 & 24/x \end{bmatrix}$ and f(x) = Tr(A). The minimum value of f(x) for x > 0 is

(A) 12 (B) 16 (C) 20 (D) 24

4. Let three matrices $A = \begin{bmatrix} 2 & 1 \\ 4 & 1 \end{bmatrix}$; $B = \begin{bmatrix} 3 & 4 \\ 2 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 3 & -4 \\ -2 & 3 \end{bmatrix}$, then

$$\text{tr}(A) + \text{tr}\left(\frac{ABC}{2}\right) + \text{tr}\left(\frac{A(BC)^2}{4}\right) + \text{tr}\left(\frac{A(BC)^3}{8}\right) + \ldots\ldots\ldots \infty =$$

(A) 6 (B) 9 (C) 12 (D) none of these

5. $\tan^{-1}n$, $\tan^{-1}(n+1)$ and $\tan^{-1}(n+2)$, $n \in N$, are the angles of a triangle if n =

(A) 1 (B) 2 (C) 3 (D) none of these

6. The equation $\log_{x+1}(x-0.5) = \log_{x-0.5}(x+1)$ has

(A) no real solution (B) no prime solution (C) an irrational solution (D) no composite solution

7. If $\lim\limits_{n\to\infty} \sum\limits_{k=2}^{n} \cos^{-1}\left(\frac{1+\sqrt{(k-1)(k+2)(k+1)k}}{k(k+1)}\right) = \frac{120\pi}{\lambda}$, find the value of λ.

8. Number of integral values of x satisfying the inequality

Column – I		**Column – II**	
(A)	$\log_{x^2}(2-x) < 0$	(p)	2
(B)	$(e^x - 1)(x^3 - x^2 + 9x - 9) < 0$	(q)	0
(C)	$\frac{\lvert x \rvert (x-4)}{\log(x+2)} < 0$	(r)	3
(D)	$\sin x < \{x\}$ in $[0, 4\pi]$ where $\{.\}$ denotes fractional part function	(s)	6

Answers Key

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

5. (A) **6.** (B)(D) **7.** 720

8. (A) $\rightarrow$ (q), (B) $\rightarrow$ (q), (C) $\rightarrow$ (r), (D) $\rightarrow$ (s)