ASSIGNMENT NO. 1

SUBJECT: MATHEMATICS   CLASS-XII

APRIL,2025

Chapter- Matrices

Ques 1 If $A = \frac{1}{\pi}\begin{bmatrix} \sin^{-1}(x\pi) & \tan^{-1}\left(\frac{x}{\pi}\right) \\ \sin^{-1}\left(\frac{x}{\pi}\right) & \cot^{-1}(\pi x) \end{bmatrix}$, $B = \frac{1}{\pi}\begin{bmatrix} -\cos^{-1}(x\pi) & \tan^{-1}\left(\frac{x}{\pi}\right) \\ \sin^{-1}\left(\frac{x}{\pi}\right) & -\tan^{-1}(\pi x) \end{bmatrix}$ then find A − B

Ques2 If A & B are symmetric matrices of the same order, then check whether is $(AB' - BA')$ is skew symmetric matrix or symmetric or null matrix.

Ques 3 Find the Matrix A such that

$$\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{bmatrix}$$

Ques 4 Find the matrix A satisfying the matrix equation:

$$\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} A \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Ques 5 Three schools A, B and C organized a mela for collecting funds for helping the rehabilitation of flood victims. They sold handmade fans, mats and plates from recycled materials at a cost of Rs 25, Rs 100 and Rs 50 each. the numbers of articles sold are given below:

School/Article	A	B	C
Handmade fans	40	25	35
Mats	50	40	50
Plates	20	30	40

Find the fund collected by each school separately by selling the above articles. Also find the total fund collected for the purpose. write one value generated by the above situation.

Ques 6 Show that the elements on the main diagonal of a skew symmetric matrix are all zero.

ANSWERS   1 $\frac{1}{2}I$ **3** $\begin{bmatrix} 1 & -2 & -5 \\ 3 & 4 & 0 \end{bmatrix}$ 4 $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$ 5 Rs 7,000, Rs 6125, Rs 7875; Total Rs 21,000

Chapter Determinants

Ques 1 If the co-ordinate of the vertices of an equilateral triangle with sides of length 'a' are

$(x_1, y_1), (x_2, y_2), (x_3, y_3)$, then $\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}^2 = \frac{3a^4}{4}$

Ques 2 Given A = $\begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$, B = $\begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$, find BA and use this to solve the system of

equation y + 2z = 7, x - y = 3, 2x + 3y + 4z = 17

Ques 3 State True or False:

a) If A=$\begin{bmatrix} x & 5 & 2 \\ 2 & y & 3 \\ 1 & 1 & z \end{bmatrix}$, xyz = 80, 3x + 2y + 10z = 20 then verify that A.adj.A = $\begin{bmatrix} 79 & 0 & 0 \\ 0 & 79 & 0 \\ 0 & 0 & 79 \end{bmatrix}$

Ques 4 The ratio of incomes of two persons is 9: 7 and the ratio of their expenditures is 4: 3. If each of them manages to save Rs 2000 per month, find their monthly incomes.

Ques 5 The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.

Ques 6 Given A = $\begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$, B = $\begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$, find BA and use this to solve the system of

equation y + 2z = 7, x - y = 3, 2x + 3y + 4z = 17

Ques 7 Find the maximum value of $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+\sin\theta & 1 \\ 1 & 1 & 1+\cos\theta \end{vmatrix}$

a) ½   **b)** $\frac{\sqrt{3}}{2}$ **c)** $\sqrt{2}$ **d)** $\frac{2\sqrt{3}}{4}$

ANSWERS **Q 2** x = 2, y = -1, z = 4   **Q 3** True   **6** x = 2, y = -1, z = 4   **7**   a

CH Relations and functions

Ques1 Let A = {1, 2, 3,..., 9} and R be the relation in A x A defined by (a, b) R (c, d) if a + d = b + c for (a, b), (c, d) in A x A. Prove that R is an equivalence relation & also obtain the equivalent class [(2, 5)].

Ques 2 Let f: R → R be the function defined by f(x) = $\frac{1}{2-\cos x}$ $\forall x \in R$ .Then, find range of f.

Ques 3 Let R be the relation on N x N defined by, $(a, b)R(c, d) \Leftrightarrow ad(c + b) = bc(a + d)$.SHOW EQ

Answers   **Q1** $\{(1,4), (2,5), (3,6), (4,7), (5,8), (6,9)\}$ **2**   [1/3,1]