MATRICES

OPERATION ON MATRICES

EXERCISE

Q.1 If $=\begin{bmatrix} x+3 & z+4 & 2y-7 \\ -6 & a-1 & 0 \\ b-3 & -21 & 0 \end{bmatrix}=\begin{bmatrix} 0 & 6 & 3y-2 \\ -6 & -3 & 2c+2 \\ 2b+4 & -21 & 0 \end{bmatrix}$, then find the values of a, b, c, x, y and z.

Q.2 Let $A=\begin{bmatrix} 1 & -3 & 2 \\ 2 & 1 & -3 \\ 4 & -3 & -1 \end{bmatrix}, B=\begin{bmatrix} 1 & 4 & 1 & 0 \\ 2 & 1 & 1 & 1 \\ 1 & -2 & 1 & 2 \end{bmatrix} \& C=\begin{bmatrix} 1 & 1 & -1 & -2 \\ 3 & -2 & -1 & -1 \\ 2 & -5 & -1 & 0 \end{bmatrix}$ be the matrices then, prove that in matrix multiplication cancellation law does not hold.

Q.3 If A, B are two matrices such that $A+B=\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}, A-B=\begin{bmatrix} 3 & 2 \\ -2 & 0 \end{bmatrix}$ then find AB.

Q.4 If $f(x) = x^2 - 3x + 3$ and $A=\begin{bmatrix} 2 & 1 \\ -1 & 1 \end{bmatrix}$ be a square matrix then prove that $f(a) = 0$. Hence find A^4.

Q.5 $\begin{bmatrix} 1 & -\tan\theta/2 \\ \tan\theta/2 & 1 \end{bmatrix}\begin{bmatrix} 1 & \tan\theta/2 \\ -\tan\theta/2 & 1 \end{bmatrix}^{-1}$ is equal to

Q.6 IF $A=\begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$ and $B=\begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$ then find the matrix X, such that $2A + 3X = 5B$

Q.7 If $A=\begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$, then show that $A^3 - 23A - 40 I = O$

Q.8 If A and B are matrices of order m × n and n × n respectively, then which of the following are defined-

(A) AB, BA (B) AB, A^2

(C) A^2, B^2 (D) AB, B^2

Q.9 If $A = \begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}$ and $A^2 + kI = 8A$, then k equals

(A) 4 (B) 8

(C) 1/4 (D) 1/16

Q.10 If A,B,C are matrices of order 1 × 3, 3 × 3 and 3 × 1 respectively, the order of ABC will be-

(A) 3 × 3 (B) 1 × 3

(C) 1 × 1 (D) 3 × 1

ANSWER KEY

1. a = – 2, b = – 7, c = – 1, x = – 3, y = – 5, z = 2

3. $AB = \begin{bmatrix} 2 & 2 \\ 0 & 2 \end{bmatrix}\begin{bmatrix} -1 & 0 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 4 \\ 4 & 4 \end{bmatrix}$

5. $\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$

6. $\begin{bmatrix} -2 & \frac{-10}{3} \\ 4 & \frac{14}{3} \\ \frac{-31}{3} & \frac{-7}{3} \end{bmatrix}$

8. D

9. B

10 C