

Time Allowed -

M:M - 25

General Instructions-

- The question paper contains three sections A, B, C. Each question is compulsory.
- Section A comprise of 5 questions of 1 mark each.
- Section B comprise of 4 questions of 2 marks each.
- Section C comprise of 3 questions of 4 marks each.

SECTION - A

Q.1 If $A = [a_{ij}] = \begin{bmatrix} 2 & -1 \\ -3 & 4 \\ 1 & 2 \end{bmatrix}$ and $B = [b_{ij}] = \begin{bmatrix} 2 & 3 & -5 \\ 1 & 4 & 9 \\ 0 & 7 & 2 \end{bmatrix}$ then find the value of $a_{11} b_{11} + a_{22} b_{22}$

(-1) Q.2 If $A = \begin{bmatrix} 3 & x-1 \\ 2x+3 & x+2 \end{bmatrix}$ is a symmetric matrix then find x.

Q.3 If $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ 2 & 5 \end{bmatrix} = \begin{bmatrix} 7 & 11 \\ K & 23 \end{bmatrix}$ then find the value of K.

(-1) Q.4 For an invertible matrix A if $A(\text{adj } A) = \begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$ then find $|\text{adj } A|$

Q.5 For what value of x, the matrix $\begin{bmatrix} 5-x & x+1 \\ 2 & 4 \end{bmatrix}$ does not exist inverse.

SECTION - B

Q.6 Find x and y if :-

$$2x + 3y = \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix} \text{ and } 3x + 2y = \begin{bmatrix} 2 & -2 \\ -1 & 5 \end{bmatrix}$$

Q.7 For what value of x :-

$$\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = 0$$

Q.8 Find the equation of line joining (1,2) and (3,6) using determinant.

Q.9 Let $A = \begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}$, where $0 \leq \theta \leq 2\pi$ then find the range of $\text{Det}(A)$

SECTION - C

Q.10 The sum of three number is 6. If we multiply third number by 3 and ^{add} second number to its, we get 11. By adding first and third numbers we get double of the second number. Represent it algebraically and find the number using matrix method

Q.11 Show that the matrix $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ satisfies the equation $A^2 - 4A + I = 0$. Where I is 2×2 identity matrix. Using this equation, find A^{-1} .

Q.12 Let $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 5 \\ 3 & 3 \end{bmatrix}$ find a matrix D such that $CD - AB = 0$.