

Name = Ijaz Khan

ID = 16764

Subject = Linear Algebra

Section = B (SE)

Semester = 2nd

Question(1)

$$A = \begin{bmatrix} 1 & 2 & -6 \\ 2 & 3 & 1 \\ 3 & 1 & 2 \end{bmatrix}$$

$$ID = 16764$$

$$-2nd = -6$$

Solution ⇒  $A = \begin{bmatrix} 1 & 2 & -6 \\ 2 & 3 & 1 \\ 3 & 1 & 2 \end{bmatrix}$

$$A_{11} = \begin{vmatrix} 3 & 1 \\ 1 & 2 \end{vmatrix} = 6 - 1 = 5$$

$$A_{12} = \begin{vmatrix} 2 & 1 \\ 3 & 2 \end{vmatrix} = 4 - 3 = 1$$

$$A_{13} = \begin{vmatrix} 2 & 3 \\ 3 & 1 \end{vmatrix} = 2 - 9 = -7$$

$$A_{21} = \begin{vmatrix} 2 & -6 \\ 1 & 2 \end{vmatrix} = 4 + 6 = 10$$

$$A_{22} = \begin{vmatrix} 1 & -6 \\ 3 & 2 \end{vmatrix} = 2 + 18 = 20$$

(2)

$$A_{23} = \begin{vmatrix} 1 & 2 \\ 3 & 1 \end{vmatrix} = 1 - 6 = -5$$

$$A_{31} = \begin{vmatrix} 2 & -6 \\ 3 & 1 \end{vmatrix} = 2 + 18 = 20$$

$$A_{32} = \begin{vmatrix} 1 & -6 \\ 2 & 1 \end{vmatrix} = 1 + 12 = 13$$

$$A_{33} = \begin{vmatrix} 1 & 2 \\ 2 & 3 \end{vmatrix} = 3 - 4 = -1$$

$$\text{Adj } A = \begin{bmatrix} 5 & 1 & -7 \\ 10 & 20 & -5 \\ 20 & 13 & -1 \end{bmatrix} \quad \underline{\text{Ans}}$$

Q Question (a)(b) Part.

$$B = \begin{bmatrix} 3 & 4 & 5 \\ 2 & -1 & 8 \\ 5 & -2 & 8 \end{bmatrix}$$

(3)

$$\text{solution} \Rightarrow B = \begin{bmatrix} 3 & 4 & 5 \\ 2 & -1 & 8 \\ 5 & -2 & 8 \end{bmatrix}$$

$$A_{11} = \begin{vmatrix} -1 & 8 \\ -2 & 8 \end{vmatrix} = -8 + 16 = 8$$

$$A_{12} = \begin{vmatrix} 2 & 8 \\ 5 & 8 \end{vmatrix} = 16 - 40 = -24$$

$$A_{13} = \begin{vmatrix} 2 & 1 \\ 5 & -2 \end{vmatrix} = -4 + 5 = 1$$

$$A_{21} = \begin{vmatrix} 4 & 5 \\ -2 & 8 \end{vmatrix} = 32 + 10 = 42$$

$$A_{22} = \begin{vmatrix} 3 & 5 \\ 5 & 8 \end{vmatrix} = 24 - 25 = -1$$

$$A_{23} = \begin{vmatrix} 3 & 4 \\ 5 & -2 \end{vmatrix} = -6 - 20 = -26$$

$$A_{31} = \begin{vmatrix} 4 & 5 \\ 1 & 0 \end{vmatrix} = 32 + 5 = 37$$

(4)

$$A_{32} = \begin{vmatrix} 3 & 5 \\ 2 & 8 \end{vmatrix} = 24 - 10 = 14$$

$$A_{33} = \begin{vmatrix} 3 & 4 \\ 2 & -1 \end{vmatrix} = -3 - 8 = -11$$

$$\text{Hence } \text{Adj} A = \begin{bmatrix} 8 & -24 & 1 \\ 42 & -1 & -26 \\ 37 & 14 & -11 \end{bmatrix} \quad \underline{\text{Ans}}$$

Question (2)

$$A = \begin{bmatrix} 1 & -2 & 3 \\ -2 & 3 & 1 \\ 4 & 3 & 2 \end{bmatrix}$$

Solution:  $A = \begin{bmatrix} 1 & -2 & 3 \\ -2 & 3 & 1 \\ 4 & 3 & 2 \end{bmatrix}$

$$A_{21} = (-1)^{2+1} \begin{vmatrix} -2 & 3 \\ -3 & 2 \end{vmatrix}$$

$$(-1)^3 (-4 + 9) \Rightarrow (-1)(5) = -5$$

(5)

$$A_{31} = (-1)^{3+1} \begin{vmatrix} -2 & 3 \\ 3 & 1 \end{vmatrix}$$

$$= (-1)^4 (-2 - 9) = 1(-11) = -11$$

$$A_{33} = (-1)^{3+3} \begin{vmatrix} 1 & -2 \\ -2 & 3 \end{vmatrix}$$

$$= (-1)^6 (3 - 4) \\ = (-1)(-1) = 1$$

Now cofactor of  $A_{21} = -5$

$$A_{31} = -11, A_{33} = 1$$

$A_{21} = -5$
$A_{31} = -11$
$A_{33} = 1$

Ans