**ASSIGNMENT NO.1** **Determinant**

1) $solve: \begin{vmatrix} x & 2 \\ 8 & 4 \end{vmatrix} = \begin{vmatrix} 1 & 1 \\ 2 & 2 \end{vmatrix}$

2) $solve: \begin{vmatrix} x & 4 & -4 \\ 3 & -2 & 1 \\ -2 & -4 & 1 \end{vmatrix} = 0$

3) $Solve: \begin{vmatrix} 2 & -3 \\ 4 & 3 \end{vmatrix} = \begin{vmatrix} x & 1 \\ -2 & x \end{vmatrix}$

4) $Find\ x\ if\ \begin{vmatrix} x & 8 \\ 2 & x \end{vmatrix} = 0$

5) $Find\ value\ of\ k\ \ if\ \ : \begin{vmatrix} 2 & -k & 7 \\ 3 & -4 & 13 \\ 8 & -11 & 33 \end{vmatrix} = 0$

6) $Find\ value\ of\ x\ \ if\ \ : \begin{vmatrix} 0 & 7 & -2 \\ 11 & x & 10 \\ 4 & 8 & 1 \end{vmatrix} = 0$

7) $Find\ value\ of\ x\ \ if\ \ : \begin{vmatrix} 2 & 3 & 1 \\ 6 & x & 2 \\ 4 & x & -2 \end{vmatrix} = 0$

8) $Find\ value\ of\ x\ \ if\ \ : \begin{vmatrix} 4 & 3 & 9 \\ 3 & -2 & 7 \\ 11 & 4 & x \end{vmatrix} = 0$

9) $Find\ value\ of\ x\ \ if\ \ : \begin{vmatrix} 1 & x & x^2 \\ 1 & 2 & 4 \\ 1 & 3 & 9 \end{vmatrix} = 0$

10) $Expand\ the\ determinant \begin{vmatrix} 3 & -5 & -1 \\ 1 & 3 & 5 \\ -5 & 1 & 3 \end{vmatrix}$

11) $Find\ \ the\ value\ of\ determinant \begin{vmatrix} 2 & 3 & 5 \\ 1 & 4 & 2 \\ 3 & 1 & 6 \end{vmatrix}$

12) $solve\ using\ crammers\ rule: X + Y + Z = 6, 3X + 3Y + Z = 12, 2X + 3Y + 2Z = 14.$

13) $solve\ using\ crammers\ rule: X + Z = 4, Y + Z = 2, X + Y = 0.$

14) $The\ voltage\ in\ an\ electric\ circuit\ are\ related\ by\ following\ eqn.$

15) $V_1 + V_2 + V_3 = 9, V_1 - V_2 + V_3 = 3, V_1 + V_2 - V_3 = 1 \quad Find V_1, V_2, V_3.$

16) $solve\ using\ crammers\ rule: \frac{x}{4} - \frac{y}{3} + \frac{z}{2} = 5, \frac{x}{3} + \frac{y}{2} - \frac{z}{5} = 11, \frac{x}{7} - \frac{y}{9} + \frac{z}{6} = -2.$

17) $solve\ using\ crammers\ rule: X + Y + Z = 4, 2X + Y + Z = 1, X - Y + Z = 0.$

18) $solve\ using\ crammers\ rule$: $\frac{5}{x+2}+\frac{3}{y+1}=2, \frac{10}{x+2}-\frac{3}{y+1}=1.$

19) $solve\ using\ crammers\ rule$: $2X+Y+Z=11, 3X-2Y-Z+4=0, X+3Y+2Z=19.$

20) $solve\ using\ crammers\ rule$: $X-2Y+3Z=4, 2X+Y-3Z=5, -X+Y+2Z=3.$

## ASSIGNMENT NO.2 Matrices

$if\ A=\begin{bmatrix}2 & 3\\ 4 & 7\end{bmatrix}\ and\ B=\begin{bmatrix}1 & 3\\ -2 & 5\end{bmatrix}\ \ Find\ 2A+3B-5I$

$if\ A=\begin{bmatrix}-1 & 3 & 4\\ 5 & 0 & -2\end{bmatrix}\ and\ B=\begin{bmatrix}3 & -2 & 1\\ -1 & 0 & -1\end{bmatrix}, C=\begin{bmatrix}1 & 0 & -1\\ 2 & 4 & -3\end{bmatrix}$

$Compute\ the\ matrix\ \ 2A+3B-4c$

$if\ A=\begin{bmatrix}-1 & 2 & -3\\ 0 & 1 & -2\end{bmatrix}\ and\ B=\begin{bmatrix}4 & 5 & -6\\ 3 & 1 & 2\end{bmatrix}, C=\begin{bmatrix}5 & -1 & -1\\ 2 & 3 & -1\end{bmatrix}$

$Find\ matrix\ X\ such\ that\ 3A+2B-X=C$

$if\ A=\begin{bmatrix}3 & 2\\ 1 & -1\\ 0 & 4\end{bmatrix}\ and\ B=\begin{bmatrix}-1 & -1\\ 3 & 2\\ 4 & -2\end{bmatrix}, Verify\ that\ (A+B)=(B+A)$

$Find\ x\ and\ y\ satisfying\ the\ eqn.\begin{bmatrix}2 & x & -3\\ y & 5 & 4\end{bmatrix}+\begin{bmatrix}5 & -2 & 3\\ 1 & -2 & 2\end{bmatrix}=\begin{bmatrix}7 & 1 & 0\\ -1 & 3 & 6\end{bmatrix}$

$Prove\ that\ the\ matrix\ \ A=\begin{bmatrix}1 & 4\\ 6 & 9\end{bmatrix}\ is\ nonsingular.$

$Find\ \ the\ matrix\ X such\ that\begin{bmatrix}4 & 5\\ -3 & 6\end{bmatrix}+X=Prove\ that\ the\ matrix\ \begin{bmatrix}10 & -1\\ 0 & -6\end{bmatrix}$

$Find\ the\ value\ of\ a,b\ if\ Prove\ that\ the\ matrix\ \begin{bmatrix}a-4b & 5\\ 6 & -a+b\end{bmatrix}=\begin{bmatrix}11 & 5\\ 6 & -5\end{bmatrix}$

$if\ A=\begin{bmatrix}4 & 1\\ 5 & 2\\ 3 & -4\end{bmatrix}, \begin{bmatrix}1 & -6 & 4\\ 2 & 0 & 3\end{bmatrix} Find\ the\ matrix\ AB\ and\ witoute\ computing\ BA\ show\ that\ AB\neq BA$

$if\ A=\begin{bmatrix}4 & 3\\ 2 & 5\end{bmatrix}, Find\ A^2-9A+14I\ where\ I\ is\ unit\ matrix.$

$if\ A=\begin{bmatrix}1 & -2 & 3\\ -1 & 2 & 1\end{bmatrix}, B=\begin{bmatrix}2 & 3\\ 3 & 1\\ 1 & 2\end{bmatrix}, Find\ the\ matrix\ AB-3I where\ I\ is\ unit\ matrix.$

$if\ A=\begin{bmatrix}2 & -2 & -4\\ -1 & 3 & 4\\ 1 & -2 & -3\end{bmatrix}\ Show\ that\ A^2=A$

$if\ A=\begin{bmatrix}0 & 1 & -1\\ 3 & -2 & 3\\ 2 & -2 & 3\end{bmatrix}\ Show\ that\ A^2=I$

$if\ A = \begin{bmatrix}1 & 2 & 3\\ 2 & 4 & 5\\ 3 & 5 & 6\end{bmatrix}, B = \begin{bmatrix}1 & -3 & 2\\ -3 & 3 & -1\\ 2 & -1 & 0\end{bmatrix} Verify\ that\ AB = I.$

$if\ A = \begin{bmatrix}7 & 0 & 2\\ 1 & 2 & 6\\ 4 & 5 & 3\end{bmatrix}, Find\ weather\ matrix\ A\ is\ singular\ or\ nonsingular$

$if\ A = \begin{bmatrix}-2 & 0 & 1\\ 1 & 2 & 3\end{bmatrix}, B = \begin{bmatrix}0 & 1\\ 2 & 3\\ 1 & 1\end{bmatrix} Show\ that\ AB\ is\ nonsingular$

$if\ A = \begin{bmatrix}2 & 4 & 4\\ 4 & 2 & 4\\ 4 & 4 & 2\end{bmatrix} Show\ that\ A^2 - 8A\ is\ scalar\ matrix$

$if\ A = \begin{bmatrix}1 & 2 & 2\\ 2 & 1 & 2\\ 2 & 2 & 1\end{bmatrix} Show\ that\ A^2 - 4A\ is\ scalar\ matrix$

$if\ A = \begin{bmatrix}1 & 2\\ -2 & 3\end{bmatrix}, B = \begin{bmatrix}2 & 1\\ 2 & 3\end{bmatrix}, C = \begin{bmatrix}-3 & 1\\ 2 & 0\end{bmatrix} Verify\ that\ A(B+C) = AB + AC$

$if\ A = \begin{bmatrix}2 & -2\\ 3 & 1\end{bmatrix}, B = \begin{bmatrix}-1 & 5\\ 4 & -3\end{bmatrix}, C = \begin{bmatrix}7 & -5\\ 0 & 5\end{bmatrix} Verify\ that\ (AB)C = A(BC)$

$if\ A = \begin{bmatrix}2 & 1 & -1\\ 3 & 1 & 2\end{bmatrix}, B = \begin{bmatrix}1 & 1\\ 2 & 0\\ 3 & -1\end{bmatrix}, C = \begin{bmatrix}1\\ 3\end{bmatrix} Verify\ that\ (AB)C = A(BC)$

$Find\ x\ and\ y\ \ if \left\{4\begin{bmatrix}1 & 2 & 0\\ 2 & -1 & 3\end{bmatrix} - 2\begin{bmatrix}1 & 3 & -1\\ 2 & -3 & 4\end{bmatrix}\right\}\begin{bmatrix}2\\ 0\\ -1\end{bmatrix} = \begin{bmatrix}x\\ y\end{bmatrix}$

$Find\ x, y\ and\ z\ \ if \left\{3\begin{bmatrix}3 & 1\\ 4 & 0\\ 3 & -3\end{bmatrix} - 2\begin{bmatrix}0 & 2\\ -2 & 3\\ -5 & 4\end{bmatrix}\right\}\begin{bmatrix}-1\\ 2\end{bmatrix} = \begin{bmatrix}x\\ y\\ z\end{bmatrix}$

$Find\ x\ and\ y\ \ if \left\{3\begin{bmatrix}4 & 1 & 3\\ 0 & -1 & -3\end{bmatrix} - 2\begin{bmatrix}3 & 2 & 4\\ -6 & 1 & -3\end{bmatrix}\right\}\begin{bmatrix}1\\ 3\\ -2\end{bmatrix} = \begin{bmatrix}x\\ y\end{bmatrix}$

$C)\ IF\ A = \begin{bmatrix}2 & -3\\ 1 & 5\end{bmatrix}\ B = \begin{bmatrix}3 & -1 & 2\\ 1 & 0 & 1\end{bmatrix}\ verify\ (AB)^T = B^T.A^T$

$d)\ IF\ A = \begin{bmatrix}2 & 5 & 6\\ 0 & 1 & 2\end{bmatrix}\ B = \begin{bmatrix}6 & 1\\ 0 & 4\\ 5 & 7\end{bmatrix}\ verify\ (AB)^T = B^T.A^T$

$e)\ IF\ A = \begin{bmatrix}1 & 2 & -1\\ 3 & 0 & 2\\ 4 & 5 & 0\end{bmatrix}\ B = \begin{bmatrix}1 & 0 & 0\\ 2 & 1 & 0\\ 0 & 1 & 3\end{bmatrix}\ verify\ (AB)^T = B^T.A^T$

$a)\ Find\ inverse\ of\ A\ \ if\ A = \begin{bmatrix} 1 & 2 & 2 \\ 1 & 0 & 1 \\ 1 & 2 & 1 \end{bmatrix}.$

$b)\ Find\ inverse\ of\ A\ \ if\ A = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}.$

$c)\ Find\ inverse\ of\ A\ \ if\ A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}.$

$d)\ Find\ inverse\ of\ A\ \ if\ A = \begin{bmatrix} 1 & 3 & 2 \\ 0 & 5 & 1 \\ -1 & 3 & 0 \end{bmatrix}.$

$e)\ Using\ matrix\ inversion\ method\ solve:\ x + 3y + 3z = 12, x + 4y + 4z = 15, x + 3y + 4z = 13.$

$f)\ Using\ matrix\ inversion\ method\ solve:\ 2x + 3y - z = -3,5x + y + 3z = 10,4x + 3y - 2z - 3 = 0.$

g) $Using\ matrix\ inversion\ method\ solve:\ x + y + z = 3, x + 2y + 3z = 4, x + 4y + 9z = 6$