

### Short Questions

Write the short answers of the following:

Q.1: Define row and column vectors.

Q.2: Define identity matrix.

Q.3: Define symmetric matrix.

Q.4: Define diagonal matrix.

Q.5: Define scalar matrix.

Q.6: Define rectangular matrix.

Q.7: Show that  $A = \begin{vmatrix} 2 & 3 & -1 \\ 1 & 1 & 0 \\ 2 & -3 & 5 \end{vmatrix}$  is singular matrix

Q.8: Show that  $A = \begin{vmatrix} 1 & 2 & 3 \\ 2 & 4 & -3 \\ 3 & -3 & 6 \end{vmatrix}$  is symmetric

Q.9: Show that  $\begin{vmatrix} b & -1 & a \\ a & b & 0 \\ 1 & a & b \end{vmatrix} = b^3 + a^3$

Q.10: Evaluate  $\begin{vmatrix} 1 & 2 & -2 \\ -1 & 1 & -3 \\ 2 & 4 & -1 \end{vmatrix}$

Q.11: Without expansion show that  $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix} = 0$

Q.12: Find x and y if  $\begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix} = \begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix}$

Q.13: Find x and y if  $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} y & 1 \\ -3 & 2x \end{bmatrix}$

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Q.14: If  $A = \begin{vmatrix} 1 & -1 & 2 \\ 3 & 2 & 5 \\ -1 & 0 & 4 \end{vmatrix}$  and  $\begin{vmatrix} 2 & 1 & -1 \\ 1 & 3 & 4 \\ -1 & 2 & 1 \end{vmatrix}$ , find  $A - B$

Q.15: Find inverse of  $\begin{bmatrix} 2 & 1 \\ 6 & 3 \end{bmatrix}$

Q.16: If  $A$  is non-singular, then show that  $(A^{-1})^{-1} = A$

Q.17: If  $A$  is any square matrix then show that  $AA^t$  is symmetric.

Q.18: Find  $K$  if  $A = \begin{bmatrix} 4 & k & 3 \\ 7 & 3 & 6 \\ 2 & 3 & 1 \end{bmatrix}$  is singular matrix

Q.19: Define the minor of an element of a matrix.

Q.20: Define a co-factor of an element of a matrix.

Q.21: Without expansion verify that  $\begin{vmatrix} \alpha & \beta + \gamma & 1 \\ \beta & \gamma + \alpha & 1 \\ \gamma & \alpha + \beta & 1 \end{vmatrix} = 0$

Q.22: What are the minor and cofactor of 3 in matrix.

$$\begin{pmatrix} 3 & 1 & -4 \\ 2 & 5 & 6 \\ 1 & 4 & 8 \end{pmatrix}$$

Q.23: What are the minor and cofactor of 4 in matrix.

$$\begin{pmatrix} 3 & 1 & -4 \\ 2 & 5 & 6 \\ 1 & 4 & 8 \end{pmatrix}$$

Q.24: If  $\begin{vmatrix} k-2 & 1 \\ 5 & k+2 \end{vmatrix} = 0$ , Then find  $k$ .

Q.25: If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ , Then find  $A + B$

Q.26: If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ , Then find  $A - B$

Q.27: If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ , Then find  $AB$

Q.28: If  $\begin{vmatrix} 2 & 3 \\ 4 & k \end{vmatrix}$  is singular, Then find  $k$ .

Q.29: Find  $A^{-1}$  if  $A = \begin{vmatrix} 5 & 3 \\ 1 & 1 \end{vmatrix}$

### Answers

Q10. 9      Q12.  $x = -1, y = 2$       Q13.  $x = -5, y = -2$

Q14.  $\begin{vmatrix} -1 & -2 & 3 \\ 2 & -1 & 1 \\ 0 & -2 & 3 \end{vmatrix}$       Q15.  $D^{-1}$  does not exist      Q18.  $k = 3$

Q22.  $M_{11} = 16, C_{11} = 16$       Q23.  $M_{32} = 26, C_{32} = -26$

Q24.  $K = \pm 3$       Q25.  $\begin{bmatrix} 3 & 5 \\ 7 & 9 \end{bmatrix}$       Q26.  $\begin{bmatrix} -1 & -1 \\ -1 & -1 \end{bmatrix}$

Q27.  $\begin{bmatrix} 10 & 13 \\ 22 & 29 \end{bmatrix}$       Q28.  $k = 6$       Q29.  $\frac{1}{2} \begin{bmatrix} 1 & -3 \\ -1 & 5 \end{bmatrix}$

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