Note:-
1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and write the correct answer. **(4)**

1. If $\dfrac{1}{3} \begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$ and |A| = 3 then adj A =

   A) $\dfrac{1}{9} \begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$ B) $\begin{bmatrix} 1 & -2 & 1 \\ 4 & -5 & -2 \\ -2 & 4 & 4 \end{bmatrix}$

   C) $\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$ D) $\begin{bmatrix} 1 & -4 & 2 \\ 2 & 5 & -4 \\ 1 & -2 & 1 \end{bmatrix}$

2. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ and A(adj A) = k I then the value of k is_____

   A) 1   B) -1
   C) 0   D) -3

Q.2 Answer the following.

(3)

1. Check whether the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 3 \end{bmatrix}$ is invertible or not.

2. Use suitable transformation on $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ to convert it into an upper triangular matrix.

3. Check whether the matrix $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ is invertible or not.

Section B
Attempt any Four

Q.3   Find the inverse of the $\begin{bmatrix} 3 & -10 \\ 2 & -7 \end{bmatrix}$ matrix (if they exist).   **(2)**

Q.4   Solve the given equations by the reduction method.   **(2)**
3*x* – *y* = 1, 4*x* + *y* = 6

Q.5   Convert $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ into an identity matrix by suitable row transformations.   **(2)**

Q.6 Find AB, if $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & -2 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 \\ 1 & 2 \\ 1 & -2 \end{bmatrix}$ Examine whether AB has inverse or not. **(2)**

Q.7 Solve the given equations by inversion method. **(2)**
$2x + 6y = 8$, $x + 3y = 5$

Q.8 Find the adjoint of the matrix $\begin{bmatrix} 2 & -3 \\ 3 & 5 \end{bmatrix}$ **(2)**

Section C
Attempt any Two

Q.9 The sum of three numbers is 2. If twice the second number is added to the sum of first and third number, we get o adding five times the first number to the sum of second and third we get 6. Find the three numbers by using matrices. **(3)**

Q.10 If $A = \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 1 \\ 3 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} 24 & 7 \\ 31 & 9 \end{bmatrix}$ then find matrix X such that AXB = C. **(3)**

Q.11 Find the inverse of the $\begin{bmatrix} 2 & 1 \\ 1 & -1 \end{bmatrix}$ matrix (if they exist). **(3)**

Section D
Attempt any One

Q.12 Find the inverse of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 3 & 3 & 0 \\ 5 & 2 & -1 \end{bmatrix}$ by the adjoint method. **(4)**

Q.13 The sum of three numbers is 6. Thrice the third number when added to the first number gives 7.On adding three times first number to the sum of second and third number we get 12. Find the three numbers by using matrices. **(4)**