



# PARISHRAM ACADEMY

NAME of Student : \_\_\_\_\_

Subject : Maths

Class : XII

State

Topic :- 2 – Matrices

M. M. :- 40

## SECTION – A (8 Marks)

Q. 1. Multiple choice questions:

(i) If  $A = \begin{bmatrix} -1 & 2 \\ 2 & -1 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$ ,  $AX = B$  then  $X$  is equal to

- (a)  $[0,7]$                       (b)  $\frac{1}{3}\begin{bmatrix} 5 \\ 7 \end{bmatrix}$                       (c)  $\frac{1}{3}[5 \ 7]$                       (d)  $\frac{-1}{3}\begin{bmatrix} 5 \\ 7 \end{bmatrix}$

(ii) If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$  and  $A(\text{adj } A) = kI$ , then the value of  $k$  is

- (a) 2                                      (b) -2                                      (c) 10                                      (d) -10

(iii) The inverse of matrix  $\begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$  is.

- (a)  $\frac{1}{13}\begin{bmatrix} 2 & -5 \\ 3 & -1 \end{bmatrix}$                       (b)  $\frac{1}{13}\begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$                       (c)  $\frac{1}{13}\begin{bmatrix} -1 & -3 \\ 5 & 2 \end{bmatrix}$                       (d)  $\frac{1}{13}\begin{bmatrix} 1 & 5 \\ 3 & -2 \end{bmatrix}$

(iv) If  $A = \begin{bmatrix} 2 & -3 \\ 4 & 1 \end{bmatrix}$  then adjoint of  $A$  is

- (a)  $\begin{bmatrix} 1 & 3 \\ -4 & 2 \end{bmatrix}$                       (b)  $\begin{bmatrix} 1 & 3 \\ 4 & -2 \end{bmatrix}$                       (c)  $\begin{bmatrix} 1 & -3 \\ -4 & 2 \end{bmatrix}$                       (d)  $\begin{bmatrix} -1 & -3 \\ -4 & 2 \end{bmatrix}$

## SECTION – B (8 Marks)

**Solve Any Four**

Q. 2. Find the co-factor of elements of matrix  $\begin{bmatrix} -1 & 2 \\ -3 & 4 \end{bmatrix}$ .

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

Q. 4. Convert  $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$  into an identity matrix by suitable row transformations.

Q. 5. If  $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ , find  $A^{-1}$  by the adjoint method.

Q. 6. If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ , verify that  $A(\text{adj } A) = (\text{adj } A)A = |A|I$ .

Q. 7. Solve the equations  $2x + 5y = 1$  and  $3x + 2y = 7$  by the method of inversion.

## SECTION – C (12 Marks)

**Solve Any Four**

Q. 8. Find the inverse of  $A = \begin{bmatrix} 3 & 2 & 6 \\ 1 & 1 & 2 \\ 2 & 2 & 5 \end{bmatrix}$  by using elementary row transformations.

Q. 9. Find the adjoint of matrix  $A = \begin{bmatrix} 2 & 0 & -1 \\ 3 & 1 & 2 \\ -1 & 1 & 2 \end{bmatrix}$

Q. 10. If  $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ , find  $A^{-1}$  by the adjoint method.

Q. 11. Show with the usual notation that for any matrix  $A = [a_{ij}]_{3 \times 3}$

(i)  $a_{11}A_{21} + a_{12}A_{22} + a_{13}A_{23} = 0$

(ii)  $a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13} = |A|$

Q. 12. Solve the following equations by the method of reduction  $x + 3y + 3z = 12$ ,  $x + 4y + 4z = 15$  and  $x + 3y + 4z = 13$

Q. 13. If three numbers are added, their sum is '2'. If 2 times the second number is subtracted from the sum of first and third number we get '8' and if three times the first number is added to the sum of second and third number we get '4'. Find the numbers using matrices.

### SECTION – D (12 Marks)

#### Solve Any Three

Q. 14. Solve the equation by the method of reduction  $x + 3y + 3z = 12$ ,  $x + 4y + 4z = 15$  and  $x + 3y + 4z = 13$ .

Q. 15. For the matrices A and B, verify that  $(AB)' = B'A'$  where

(a)  $A = \begin{bmatrix} 1 \\ -4 \\ 3 \end{bmatrix}$ ;  $B = [-1 \ 2 \ 1]$

(b)  $A = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$ ;  $B = [1 \ 5 \ 7]$

Q. 16. The sum of three numbers is 6. If we multiply third number by 3 and add it to the second number we get 11. By adding first and the third numbers we get a number which is double the second number. Use this information and find a system of linear equations. Find the three numbers using matrices.

Q. 17. Solve the following equations by the method of inversion  $x - y + z = 4$ ,  $2x + y - 3z = 0$ ,  $x + y + z = 2$ .

Q. 18. The total cost of 3 T.V. sets and 2 V.C.R.'s is Rs. 35,000. The shopkeeper wants profit of Rs. 1000 per T.V. set and Rs. 500 per V.C.R. He sells 2 T.V. sets and 1 V.C.R. and gets the total revenue as Rs. 21,500. Find the cost price and the selling price of a T.V. set and a V.C.R.