RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATION

CBSE PRACTICE PAPER(2024)

(Mathematics)

Grade : XII **Marks: 40**

marks

Chapter: MATRICES Set-2 **Time: 90**

minutes

SECTION A

(This section comprises of Multiple-choice questions (MCQ) of 1 mark each.)

1. Which of the following is not a property of invertible matrices if A and B are matrices of the same order?

a) $(AB)^{-1}=A^{-1}B^{-1}$ b) $(AA^{-1})=(A^{-1}A)=I$ c) $(AB)^{-1}=B^{-1}A^{-1}$ d) $AB=BA=I$

2. Which of the following matrices will remain same if the elementary operation $R_1 \rightarrow 2R_1+3R_2$ is applied on the matrix?

a) $\begin{bmatrix}1 & 2 & 3\\ 3 & 4 & 1\end{bmatrix}$ b) $\begin{bmatrix}0 & 0 & 0\\ 0 & 0 & 0\\ 0 & 0 & 0\end{bmatrix}$ c) $\begin{bmatrix}0 & 1 & 0\\ 1 & 0 & 1\\ 0 & 1 & 0\end{bmatrix}$ d) $\begin{bmatrix}1 & 0\\ 1 & 2\\ 1 & 0\end{bmatrix}$

3. Which of the following conditions holds true for a skew-symmetric matrix?

a) A=IA| b) A=|A| c) A=A' d) A=-A'

4. The matrix $A=\begin{bmatrix}0 & 1 & -1\\ -1 & 0 & 1\\ 1 & -1 & 0\end{bmatrix}$ is

a) scalar matrix b) identity matrix c) symmetric matrix d) skew-symmetric matrix

5. If $A=\begin{bmatrix}2\\ 7\\ 8\end{bmatrix}$, $B=[-3\ 4\ 1]$, find (AB)'.

a)(AB)'= $\begin{bmatrix}-6 & -21 & -24\\ 8 & 28 & 32\\ 2 & 7 & 8\end{bmatrix}$ b)(AB)'= $\begin{bmatrix}-6 & 8 & 2\\ -21 & -28 & 7\\ -24 & 32 & 8\end{bmatrix}$ c (AB)'= $\begin{bmatrix}6 & 21 & 24\\ -8 & 28 & 7\\ -2 & 7 & -8\end{bmatrix}$ d (AB)'= $\begin{bmatrix}-6 & 8 & -21\\ 8 & 2 & 7\\ -24 & 8 & 2\end{bmatrix}$

6. Let for any matrix M ,M^{-1} exist. Which of the following is not true.

a) $(M^{-1})^2=(M^2)^{-1}$ b) $(M^{-1})^{-1}=(M^{-1})^1$ c) $(M^{-1})^{-1}=M$ d) none of these

7. If A and B are square matrices of the same order, then (A + B) (A – B) is equal to

(A) A^2-B^2 (B) $A^2-BA-AB-B^2$ (C) $A^2-B^2+BA-AB$ (D) A^2-BA+B^2+AB

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

(A) only AB is defined. (B) only BA is defined (C) AB and BA both are defined (D) AB and BA both are not defined

9. The matrix $A=\begin{bmatrix}0 & 0 & 5\\ 0 & 5 & 0\\ 5 & 0 & 0\end{bmatrix}$

(A) scalar matrix (B) diagonal matrix (C) unit matrix (D) square matrix

10 If A and B are symmetric matrices of the same order, then (AB′ –BA′) is a

(A) Skew symmetric matrix (B) Null matrix (C) Symmetric matrix (D) None of these

SECTION B

(This section comprises of very short answer type-questions (VSA) of 2 marks each.)

11 If a matrix has 28 elements, what are the possible orders it can have? What if it has 13 elements?

12 Construct $a_{2\times 2}$ matrix where (i) $a_{ij} = \frac{(i-2j)^2}{2}$ (ii) $a_{ij} = |-2i + 3j|$

13 Construct a 3×2 matrix whose elements are given by $a_{ij} = e^{ix}\sin jx$

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

14 Find non-zero values of x satisfying the matrix equation: $x\begin{bmatrix}2x & 2\\ 3 & x\end{bmatrix} + 2\begin{bmatrix}8 & 5x\\ 4 & 4x\end{bmatrix} = 2\begin{bmatrix}x^2+8 & 24\\ 10 & 6x\end{bmatrix}$

15 Show that $A = \begin{bmatrix}5 & 3\\ -1 & -2\end{bmatrix}$ satisfies the equation $A^2 - 3A - 7I = O$ and hence find A^{-1}.

16 Find A, if $\begin{bmatrix}4\\1\\3\end{bmatrix}$ $A = \begin{bmatrix}-4 & 8 & 4\\ -1 & 2 & 1\\ -3 & 6 & 3\end{bmatrix}$

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

17 Express the matrix $\begin{bmatrix}2 & 3 & 1\\ 1 & -1 & 2\\ 4 & 1 & 2\end{bmatrix}$ as the sum of a symmetric and a skew symmetric matrix.

18 If AB = BA for any two square matrices, prove by mathematical induction that $(AB)^n = A^n B^n$

19 Find x, y, z if $A = \begin{bmatrix}0 & 2y & z\\ x & y & -z\\ x & -y & z\end{bmatrix}$ satisfies $A' = A^{-1}$.