Mathematics Assignment For Class X

General Directions For Students :Whatever be the notes provided , everything must be copied in the maths copy and then do the homework in the same copy

Chapter 8: Matrices (Part -1) Introduction

Matrices (Introduction)

- **Matrix**: A rectangular arrangement of numbers , in rows and column enclosed in a bracket "[ ]" is called a matrix.
- Horizontal lines are called **rows.**
- Vertical lines are called **columns**
- **Element of a matrix**: Each number of a matrix is called element of the matrix .For example element of the matrix $\begin{bmatrix} 2 & 6 \\ 7 & 1 \end{bmatrix}$ are 2,6, 7 and 1
- **Order of a matrix**: If a matrix has 2 rows and 3 columns, we call it a 2X3 matrix (read as "2 by 3 matrix").If a matrix contain m rows and n column , then it is called a matrix of order m x n matrix (read as" m by n matrix") .
  A matrix of order mxn has mn elements
  An element appearing in the i^{th} row and j^{th} column of a matrix is called its (i, j)th element
- **Notation:** Matrices are usually denoted by Capital letters, and the elements of matrix by a small letter of the alphabet along with two suffixes *i* &*j* , the first one *i* indicating number of rows and the latter one *j* , number of column in which the element appears. thus the matrix of order m X n may be written as $\left[a_{ij}\right]_{mxn}$

Types of Matrices

- **Row Matrix** : A matrix which has only one row is called row matrix.
- **Column Matrix** : A matrix which has only one column is called column matrix .
- **Square matrix**: A matrix having same number of columns as it has rows is called a square matrix.
- **Rectangular matrix**: A matrix in which number of rows is not equal to number of columns is called rectangular matrix.
- **Zero or Null matrix**: A matrix each of whose elements is zero is called a zero or a null matrix.
- **Diagonal matrix** : A square matrix having all the elements zero, except the principal diagonal elements, is called diagonal elements. For example ; $\begin{bmatrix} 5 & 0 \\ 0 & 6 \end{bmatrix}$.
- **Unit matrix or Identity Matrix** : A square matrix in which each diagonal element is unity and all the other elements being zero is called a unit matrix or Identity Matrix .
- **Transpose Matrix** : A matrix obtained from a given matrix A by interchanging its rows and columns is called its transpose matrix. It is denoted by A' or A^T .

Equality of two Matrices :

Two matrices are said to be equal if and only if :

- Both are of same order
- Their corresponding elements are equal

Exercise 8.1

Q1Classify the following matrices :

i) $\begin{bmatrix} 2 & 3 & 7 \end{bmatrix}$

It has one row and three columns therefore its order is 1x3

Since it has only one row it is Row matrix of order 1x3

ii) $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

Ans: It is zero matrix of order2x3

Q2.i)If a matrix has 4 elements , what are possible orders it can have?

Since all matrices of order 1x4, 4x1 or 2x2 contain 4 elements , a matrix containing 4 elements can have any one of the following order:

1x4, 4x1 or 2x2 .....Ans

Q3.ii)Construct a 2x2 matrix whose elements a_{ij} is given by $a_{ij}=2i - j$

Solution . Given $a_{ij}=2i - j$

$\therefore$ a_{11} =2(1) - 1=1 , a_{12} = 2(1) - 2 =0 ,

a_{21} = 2(2) - 1 =3, a_{22} = 2(2) -2 =2

Hence , required matrix = $\begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$.

Homework : Exercise 8.1 Q1 ii), iii), iv), v), Q.2.ii), Q3.ii) Q.5, Q.7, Q.10,