

UNIT TEST - I (2021-22)
CLASS – XII
MATHEMATICS

M.M: 20

Instructions: All questions are compulsory.

A. Choose the correct option (Multiple Choice Questions).

1 × 2 = 2

1. If a, b, c are non zero real numbers, then the inverse of matrix $A = \begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$ is

- (a) $\frac{1}{abc} \begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$ (b) $\begin{bmatrix} \frac{1}{a} & 0 & 0 \\ 0 & \frac{1}{b} & 0 \\ 0 & 0 & \frac{1}{c} \end{bmatrix}$ (c) $\frac{1}{abc} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (d) none of these.

2. If A and B are two matrices such that $AB = A$ and $BA = B$, then B^2 is equal to

- (a) A (b) B (c) I (d) none of these.

B. Very Short Answer Questions.

1 × 3 = 3

1. If $A = [a_{ij}]$ is square matrix of order 3×3 such that $a_{ij} = i^2 - j^2$ then find A.

2. Given $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ and $A^{100} = 2^k A$, then find k.

3. If A is a square matrix such $A^2 = A$, then write the value of $7A - (I+A)^3$, where I is identity matrix.

C. Short Answer Questions Type-I

2 × 2 = 4

1. If $A = \begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find k so that $A^2 = kA - 2I$.

2. If the ad joint of a matrix P is $\begin{bmatrix} 1 & 4 & 4 \\ 2 & 1 & 7 \\ 1 & 3 & 3 \end{bmatrix}$, then find the values of the determinant of P.

D. Short Answer Questions Type-II

3 × 2 = 6

1. If A and B are symmetric matrices, prove that $AB-BA$ is a skew symmetric matrix.

2. Using cofactors of elements of third column, evaluate $\Delta = \begin{vmatrix} 1 & x & yz \\ 1 & y & zx \\ 1 & z & xy \end{vmatrix}$.

E. Long Answer question.

5 × 1 = 5

1. If $A = \begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$, find A^{-1} .

Hence Solve the system of equations $x-2y = 10$, $2x-y-z = 8$, $-2y+z = 7$.