

SUCCESS KEY TEST SERIES

Work Sheet

Std: 11th Science

Subject: Mathematics & Statistics

Time: 1Hrs

Date :

4. Determinants and Matrices

Max Marks: 40

Q.1 Select and write the most appropriate answers from given alternatives:

10

1)

$$\text{Let } D = \begin{vmatrix} \sin\theta \cdot \cos\phi & \sin\theta \cdot \sin\phi & \cos\theta \\ \cos\theta \cdot \cos\phi & \cos\theta \cdot \sin\phi & -\sin\theta \\ -\sin\theta \cdot \sin\phi & \sin\theta \cdot \cos\phi & 0 \end{vmatrix} \text{ then}$$

(a) D is independent of θ

(b) D is independent of ϕ

(c) D is a constant

(d) $\frac{dD}{d\theta}$ at $\theta = \pi/2$ is equal to 0

2) Row matrix has

- (a) Only one row (b) two rows
(c) more than two rows (d) All of the above

3) Which of the following property of matrix multiplication is correct;

- (a) Multiplication is not commutative in general
(b) Multiplication is associative
(c) Multiplication is distributive over addition
(d) All of above

4) For a skew symmetric odd ordered matrix A of integers, which of the following will hold true.

- (a) $|A| = 9$ (b) $|A| = 81$ (c) $|A| = 0$ (d) $|A| = 4$

5) If A, B and C are of same order and $(A + B) + C = A + (B + C)$ this law is known as

- (a) Cramer's law (b) Distributive law
(c) Associative law (d) Commutative law

Q.2 Solve the following:

5

1) Classify the following matrices as, a row, a column, a square, a diagonal, a scalar, a unit, an upper triangular, a lower triangular, a symmetric or a skew-symmetric matrix

$$\begin{bmatrix} 5 \\ 4 \\ -3 \end{bmatrix}$$

2) Which of the following matrices are singular or non singular?

$$\begin{bmatrix} 7 & 5 \\ -4 & 7 \end{bmatrix}$$

3) Without expanding evaluate the following determinants

$$\begin{vmatrix} 2 & 7 & 65 \\ 3 & 8 & 75 \\ 5 & 9 & 86 \end{vmatrix}$$

4) Evaluate $\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix} \begin{bmatrix} 2 & -4 & 3 \end{bmatrix}$

5) If $A = \begin{bmatrix} 1 & -2 \\ 5 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -3 \\ 4 & -7 \end{bmatrix}$

then find the matrix $A - 2B + 6I$, where I is the unit matrix of order 2.

Q.3 Answer the following:

10

1) If $A = \begin{bmatrix} 7 & 3 & 0 \\ 0 & 4 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -2 & 3 \\ 2 & 1 & -4 \end{bmatrix}$ then find $A^T + 4B^T$

2) Examine the collinearity of the following set of point

$L\left(0, \frac{1}{2}\right)$, $M(2, -1)$, $N\left(-4, \frac{7}{2}\right)$

3) If $A = \begin{bmatrix} 2 & -3 \\ 5 & -4 \\ -6 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 4 & -1 \\ -3 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 2 \\ -1 & 4 \\ -2 & 3 \end{bmatrix}$ then show that

$(A+B)^T = A^T + B^T$

4) Construct a matrix $A = [a_{ij}]_{3 \times 2}$ whose elements a_{ij} are given by

$a_{ij} = \frac{(i+j)^3}{5}$

5) Find the value of x if

$\begin{vmatrix} x & -1 & 2 \\ 2x & 1 & -3 \\ 3 & -4 & 5 \end{vmatrix} = -10$

Q.4 Solve the following:

15

1) Verify that $A(B + C) = AB + BC$ in the following matrices:

$A = \begin{bmatrix} 1 & -1 & 3 \\ 2 & 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ -2 & 3 \\ 4 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 2 \\ -2 & 0 \\ 4 & -3 \end{bmatrix}$

2) If $A = \begin{bmatrix} 2 & 3 & -1 \\ 4 & 7 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 & 2 \\ 4 & 6 & -1 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 & 6 \\ 0 & 2 & -5 \end{bmatrix}$

find the matrix x such that $3A - 2B + 4X = 5C$.

3) Express the following matrices as the sum of a symmetric and a skew symmetric matrix

$\begin{bmatrix} 3 & 3 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2 \end{bmatrix}$

4) Find the area of triangle whose vertices are

$$P\left(\frac{3}{2}, 1\right), Q(4, 2), R\left(4, \frac{-1}{2}\right)$$

5) Find x and y, if

$$\left\{4\begin{bmatrix} 2 & -1 & 3 \\ 1 & 0 & 2 \end{bmatrix} - \begin{bmatrix} 3 & -3 & 4 \\ 2 & 1 & 1 \end{bmatrix}\right\} \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$$

----- All the Best -----