Graphic Era HILL UNIVERSITY
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University under section 2(f) of UGC Act, 1956

GEHU/04M/9.1.3

Term Evaluation (Even) Semester Examination March 2025

Roll No.....

Name of the Course: **Diploma**
Semester: II
Name of the Paper : **Applied Mathematics - II**
Paper Code : **DTMA-201**
Time : 1.5 hour

Maximum Marks: 50

Note : (i) Answer all the questions by choosing any one of the sub questions.
(ii) Each question carries 10 marks.

1. (a) Solve the following linear system of equations: **10 Marks** (CO1)

$$x + 4y + 9z = 6$$
$$x + 2y + 3z = 4$$
$$x + y + z = 3.$$

OR

(b) Find the inverse of the following matrices: **10 Marks** (CO1)

$$A = \begin{bmatrix} 3 & 6 \\ 8 & 7 \end{bmatrix}$$

and

$$B = \begin{bmatrix} 5 & 2 & 0 \\ 0 & 1 & 5 \\ 0 & 0 & 1 \end{bmatrix}.$$

2. (a) Find the rank of the following matrices: **10 Marks** (CO1)

$$P = \begin{bmatrix} 10 & -10 \\ 10 & -10 \end{bmatrix}$$

and

$$Q = \begin{bmatrix} 5 & -1 & 3 \\ -3 & 0 & -5 \\ 2 & 8 & -8 \end{bmatrix}.$$

OR

(b) Verify the Cayley Hamilton theorem for the matrix **10 Marks** (CO1)

$$A = \begin{bmatrix} -4 & 0 & 1 \\ 1 & 0 & 2 \\ 5 & 6 & -2 \end{bmatrix}.$$

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3. (a) Find the eigen values of the following matrices: **10 Marks (CO1)**

$$A = \begin{bmatrix} 8 & 5 \\ 7 & 8 \end{bmatrix}$$

and

$$B = \begin{bmatrix} -5 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 6 \end{bmatrix}.$$

OR

(b) Define the following terms with suitable example: **10 Marks (CO1)**
(i) Diagonal Matrix
(ii) Zero Matrix
(iii) Row Matrix
(iv) Identity Matrix

4. (a) Let $\vec{a} = 5i - 4j$ and $\vec{b} = -9i + 6j$. Then find
(i) $\vec{a} + \vec{b}$
(ii) $\vec{b} - \vec{a}$
(iii) $\vec{a} - \vec{b}$ **(10 Marks (CO 2))**

OR

(b) Let $\vec{x} = 9i + 8j - 2k$ and $\vec{y} = 6i - 2j + 6k$. Then find
(i) $\vec{x} \times \vec{y}$
(ii) $\vec{x} \cdot \vec{y}$ **10 Marks (CO2)**

5. (a) Calculate the angle between two vectors $\vec{a}$ and $\vec{b}$ if $|\vec{a}| = 1$, $|\vec{b}| = 2$, and their dot product is $\vec{a} \cdot \vec{b} = 1$. **10 Marks (CO2)**

OR

(b) If $\vec{x}$ and $\vec{y}$ are two vectors such that $|\vec{x}| = 3$, $|\vec{y}| = \sqrt{2}/3$, and their cross product is a unit vector, then what is the angle between them? **10 Marks (CO2)**