Graphic Era HILL UNIVERSITY

End Term (Odd) Semester Examination November 2025

Roll no.....

Name of the Course: Diploma in Engineering
Semester: I
Name of the Paper: Applied Mathematics-I
Paper Code: DTMA-101
Time: 3 hours

Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub-questions from a, b, and c in each main question.
(iii) Total marks for each question are 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. **(CO1) (2X10=20 Marks)**

a. Resolve into partial fractions $\frac{2}{(x-1)(x-3)}$.

b. Find 31^{st} term of the series 6, 3, 0, -3, -6,..., and also sum up the series upto 31 terms.

c. What are permutations and combinations? Evaluate ${}^{6}P_{4}$.

Q2. **(CO2) (2X10=20 Marks)**

a. Compute $(99)^4$ by using the binomial theorem.

b. Define the Sine formula, Cosine formula, and Tangent formula.

c. Evaluate: i^{12} and i^{44}.

Q3. **(CO3) (2X10=20 Marks)**

a. Define a straight line? Find the slope of line passing through the points (4, -6), (-2, -5).
b. Show that line joining (2, -5) and (-2, 5) is perpendicular to the line joining (6, 3) and (1, 1).
c. Define a circle? Find the equation of a circle whose center is at (0, 2) and radius = 2.

Q4 **(CO4) (2X10=20 Marks)**

a. Define a parabola? Find the vertex, focus, directrix, and latus rectum of parabola $y^2 = 4x$.

b. What is a function? Define the domain and range of functions sin(x) and cos(x).

c. Find $\lim_{x\to 5}\frac{x^2-25}{x-5}$.

Q5. **(CO5) (2X10=20 Marks)**

a. Show that $\begin{cases} 3x+1, & x>1 \\ 4, & x=1 \\ 5x-1, & x<1 \end{cases}$ is continuous function at x = 1.

b. Find $\int 3x^3+5x^2+10\ dx$.

c. Find $\int x\sin x\,dx$.