Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination November 2025

Roll No.....

Name of the Course and semester: Diploma CSE/CE/ME, III Semester
Name of the Paper: Applied Mathematics
Paper Code: DTMA 305/301

Time: 3 Hour **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 is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. CO1(2X10=20 Marks)

a. Integrate the following functions with respect to x.
$(i)\ x^3(1-x^2)$ $(ii)\ 2x^3 - 3sinx + 5\sqrt{x})$

b. Integrate the following functions
$(i)\int \frac{dx}{9x^2-16}\,dx$ $(ii)\int (x^{3/2} + 2e^x - \frac{1}{x})dx$

c. Integrate the following by the method of partial fractions
$(i)\int \frac{3x-4}{x^2-3x+2}\,dx$ $(ii)\int \frac{dx}{(x-2)(x+1)}$

Q2. CO2(2X10=20 Marks)

a. Compute integral of the following functions
$(i)\int_0^{\pi/2} xcosxdx$ $(ii)\int_0^{\pi} xcos2xdx$

b. Integrate the following function
$(i)\int (x^2+x)e^x\,dx$ $(ii)\int xlogx\,dx$

c. Compute the following function
$(i)\int x^2 cosx\,dx$ $(ii)\int x^2 e^x\,dx$

Q3. CO3(2X10=20 Marks)

a. Form the differential equation by eliminating the arbitrary constant from $y = Ae^{3x} + Be^{-3x}$.
b. What is differential equation? Define the order and degree of a differential equation with examples.
c. Solve the differential equation $e^y(dy + dx) = xe^x dx$.

Q4. CO4(2X10=20 Marks)

a. Define the following distribution with its applications.
(i) Binomial Distribution (ii) Poison Distribution.
b. A Poisson distribution has a double mode at x=3 and x=4. What is the probability that x will have one or the other of these two values?
c. The mean and variance of Binomial distribution are 40 and 36. Find the value of n, p and q.

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Q5. CO1(2X10=20 Marks)

a. Apply Gauss elimination method to solve the equations $x + 4y - z = -5$, $x + y - 6z = -12$, $3x - y - z = 4$.

b. Find a root of the equation $f(x) = x^3 - 3x - 5 = 0$ using Newton-Raphson method.

c. Apply Gauss-Seidel method to solve the equations $10x + 2y + z = 9$, $x + 10y - z = -22$, $-2x + 3y + 10z = 22$.