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

End term Back Paper Examination December 2024

Roll no. 2271297

Name of the Course and semester: BCA, IV
Name of the Paper: Computer Based Numerical Techniques
Paper Code: TBC 405
Time: 3 hour
Maximum Marks:100

Note:
(i) Answer all the questions by choosing any one of the sub questions
(ii) Each question carries 20 marks.
(iii) Please specify COs against each question.

Q1. (20Marks)

a. What do you mean by error in numerical computation? Explain different types of error in numerical computation with the help of suitable examples. CO1

OR

b. Describe absolute and relative and percentage errors. Find the absolute, percentage and relative errors if x is rounded-off to three decimal digits. Given x = 0.005998. CO1

OR

c. Find a real root of the equation $x^3 - 2x - 5 = 0$using bisection method up 4 iteration only. CO1

Q2. (20Marks)

a. Solve the following system of linear equations using Gauss Elimination method. CO2

$$x + 2y + z = 3$$
$$2x + 3y + 3z = 10$$
$$3x - y + 2z = 13$$

OR

b. Find f(10) using the following data: CO2

x	5	6	9	11
f(x)	12	13	14	16

OR

c. Using Newton forward difference formula, find a cubic polynomial which takes the following data: CO2

x	0	1	2	3
f(x)	1	0	1	10

Q3. (20Marks)

a. Solve the integral using Simpson's 1/3 rule. CO3

$$\int_0^1 \frac{1}{1+x^2} dx$$

OR

a. Estimate the missing terms in the following table: CO3

End term Back Paper Examination December 2024

x	0	1	2	3	4
$f(x)$	1	3	9	?	81

OR

b. Find the solution of the differential equation CO3

$$\frac{dy}{dx} = y - x$$

given $y(0) = 2$using Runge Kutta method at $x = 0.2$.

Q4. (20Marks)

a. Define the following terms: CO4

1. Histogram
2. Frequency polygon
3. Less than cumulative frequency curve (less than ogive)
4. More than cumulative frequency curve (more than ogive)

OR

b. Using the Gauss backward interpolation formula, find the population for the year 1836given that. CO4

year	1801	1811	1821	1831	1841	1851
population	12	15	20	27	39	52

OR

c. Find the curve of best fit of the type $y = ae^{bx}$ to the following data by the method of least squares: CO4

x	1	5	7	9	12
y	10	15	12	15	21

Q5. (20Marks)

a. Draw the trend line by semi-average method using the given data. CO5

Year	1998	1999	2000	2001	2002	2003
Production (in Tons)	253	260	255	266	259	264

b. Explain the various component of time series? CO5

c. Calculate the three yearly moving average of profits of a commercial concern from the following.

year	1991	1992	1993	1994	1995	1996	1997	1998
profit	42	47	52	45	13	65	37	57