

## **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.

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.

e. 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:

CO<sub>2</sub>

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

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

			e la			
X	0	1	2	3		
f(x)	1	0	1	_ 10		

Q3.

(20Marks)

CO3 -

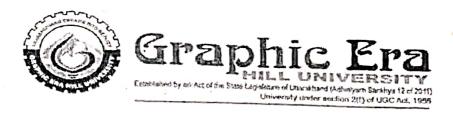
a. Solve the integral using Simpson's 1/3 rule.

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

OR

a. Estimate the missing terms in the following table:

CO3



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x	0 .	1	2	3	$\Lambda$
F(m)	1				7
$\int (x)$	1.	3	9	?	81

OR

b. Find the solution of the differential equation

CO<sub>3</sub>

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

given  $y(0) = 2u \sin R$ unge 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.

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:

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	Х	1	5	7	9	12
	y	10	15	12	15	21

Q5.

(20Marks) CO5

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

l	e tiend line by	seim-ave	rage men	nou using	, the give	II data.	
	Year	1998	1999	2000	2001	2002	2003
	Production	253	260	255	266	259	264
	(in Tone)						

b. Explain the various component of time series?

COS

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

•	Calculate the time form, many								
	year	1991	1992	1993	1994	1995	1996	1997	1998
	profit	42	47	52	45	13	65	37	57