

A-8985

Sub. Code

4BCESA4

U.G. DEGREE EXAMINATION, NOVEMBER 2019

Computer Science

**Allied – COMPUTER ORIENTED NUMERICAL
METHODS**

(CBCS - 2014 onwards)

Time : 3 Hours

Maximum : 75 Marks

Section A

(10 × 2 = 20)

Answer **all** questions.

1. Give an example of
 - (a) algebraic
 - (b) transcendental equations
2. What is the condition for convergence of Gauss-Jacobi method of iteration?
3. Convert $y = ax^3 + b$ into linear form.
4. What is the method of moments?
5. Define: Backward Difference Operator.
6. State Newton's Forward Interpolation Formula
7. What is the order of error in Trapezoidal formula?
8. State Simpson's one-third rule.

9. What is meant by numerical solution of a differential equation?
10. Write Milne's predictor-corrector formulae.

Section B

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Find a real root of the equation $x^3 - 2x - 5 = 0$, correct to 3 places of decimals, using Bisection method.

Or

- (b) Explain briefly Gauss Jordan method to solve simultaneous equations
12. (a) Fit a straight line to the following data using the method of moments:

x :	1	2	3	4
y :	0.30	0.64	1.32	5.40

Or

- (b) Find the largest eigen value of the matrix

$$\begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

and the corresponding eigen vector.

13. (a) Using Newton's forward interpolation formula, find the value of y when $x=21$ from the following tabulated values of the function

x :	20	23	26	29
y :	0.3420	0.3907	0.4384	0.4848

Or

- (b) Using Lagrange's interpolation formula, find the form of the function $y(x)$ from the following table.

x :	0	1	3	4
y :	-12	0	12	24

14. (a) Explain briefly about the Gaussian Quadrature formula.

Or

- (b) Evaluate $\int_0^{\pi} \frac{\sin x}{x} dx$ using Trapezoidal rule with 6 sub-intervals.

15. (a) Use Taylor series method of the fourth order to solve the following differential equation and find $y(0.1)$ and $y(0.2)$ given that

$$dy/dx = 1 + xy, \quad y(0) = 2.$$

Or

- (b) Find $y(1.1)$, given $dy/dx = x + y$, $y(1) = 2$ by Euler's method.

Section C

(3 × 10 = 30)

Answer any **three** questions.

16. Solve by Gauss Elimination method.

$$2x + y + 4z = 12$$

$$8x - 3y + 2z = 20$$

$$4x + 11y - z = 33$$

17. Find the equation of the best-fitting straight line to the following data by the method of group averages.

$$x : \quad 0 \quad 5 \quad 10 \quad 15 \quad 20 \quad 25 \quad 30$$

$$y : \quad 10 \quad 14 \quad 19 \quad 25 \quad 31 \quad 36 \quad 39$$

18. Given the values

x :	14	17	31	35
y :	68.7	64.0	44.0	39.1

Find the value of $f(x)$ corresponding to $x=27$.

19. Find the values of y' and y'' at $x=51$ and $x=55$ from the following data, using Newton's forward interpolation formula.

x :	50	51	52	53	54	55	56
y :	3.684	3.7084	3.7325	3.7563	3.7798	3.8030	3.8259

20. Use Runge-kutta of the fourth order to solve the equation and to find $y(0.2)$, $y(0.4)$ and $y(0.6)$ taking $h=0.2$ given that $dy/dx=1+y*y$; $y(0)=0$.
