E–0340	Sub. Code
	1BCESA4

U.G. DEGREE EXAMINATION, APRIL 2019

Computer Science

Allied : COMPUTER ORIENTED NUMERICAL METHODS

(CBCS 2011 onwards)

Time : Three Hours   Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **ALL** questions.

1. Define transcendental equation with an example.

2. Define diagonally dominant with an example.

3. What is empirical law?

4. What is characteristic equation?

5. Write a note on forward differences.

6. What is inverse interpolation?

7. Write derivatives using backward difference formula.

8. What is the use of Romberg's method?

9. What is Picard's method?

10. Write fourth order R-K method.

Part B $(5 \times 5 = 25)$

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

11. (a) Find the real root of $x^3 - 3x + 1 = 0$ lying between 1 and 2 upto three decimal places by Newton Raphson method.

Or

(b) Write the step by step procedure for solving algebraic equations using Horner's method.

12. (a) Explain linear law for curve fitting.

Or

(b) Fit a straight line $Y = ax + b$ to the following data by the method of group averages.

x :	0	5	10	15	20	25
y :	12	15	17	22	24	10

13. (a) Find the value of y from the following data at $x = 2.65$.

x :	−1	0	1	2	3
y :	−21	6	15	12	3

Or

(b) Estimate the missing term from the following :

x :	1	2	3	4	5
y :	7	—	13	21	37

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14. (a) Find the first and second derivative of y at $x = 0.6$.

x :	0.4	0.5	0.6	0.7	0.8
y :	1.58	1.80	2.04	2.33	2.65

Or

(b) Derive Trapezoidal rule.

15. (a) Using Taylor's method, find $y(0.1)$ correct to 3 decimal places from $\dfrac{dy}{dx} + 2xy = 1$, $y_0 = 0$.

Or

(b) Using Picard's method solve $\dfrac{dy}{dx} = 1 + xy$ with $y(0) = 2$. Find $y(0.1)$.

Part C $(3 \times 10 = 30)$

Answer any **THREE** questions.

16. Solve the following system of equations using Gaussian elimination method.

$$x + y + z = 9$$
$$2x - 3y + 4z = 13$$
$$3x + 4y + 5z = 40.$$

17. Find the eigen values and eigen vectors of the matrix $A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$ by Jacobi's method.

18. Use Lagrange's interpolation formula to find the value of y when $x = 10$ if the following values of x and y are given.

x :	5	6	9	11
y :	12	13	14	16

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19. Evaluate $\int_0^2 \dfrac{dx}{x^2 + 4}$ using Romberg's method.

20. Solve by Milne's Predictor–Corrector method $\dfrac{dy}{dx} = \dfrac{2y}{x}$ at $x = 2$, given that $y\,(1) = 2$, $y\,(1.25) = 3.13$, $y\,(1.5) = 4.5$ and $y\,(1.75) = 6.13$.

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