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J-274

B.C.A. (Part-II) Examination, 2021

(Theoretical Foundation of Computer Science)

Paper - I

NUMERICAL ANALYSIS

Time Allowed : Three Hours

Maximum Marks : 50

Minimum Pass Marks : 20

Note : Attempt all five questions. One question from each unit is compulsory. All questions carry equal marks.

Unit–I

Q. 1. Use Newton's method to find a root of the equation :

$x^3 - 3x - 5 = 0$

OR

Q. 2. Find a real root of the equation $x^3 - 9x + 1 = 0$, by the method of false position.

Unit–II

Q. 3. Solve by Gauss-elimination method :

$10x + y + 2z = 13$

$3x + 10y + 2 = 14$

$2x + 3y + 10z = 15$

OR

Q. 4. Apply factorization method to solve the equations :

$3x + 2y + 7z = 4$

$2x + 3y + z = 5$

$3x + 4y = z = 7$

Unit–III

Q. 5. Find the cubic polynomial which takes the following values :

x : 0 1 2 3

y : 1 0 1 10

OR

Q. 6. Determine by Lagrange's formula the percentage number of criminal under 35 years :

Age	% number of criminals
Under 25 years	52.0
Under 30 years	67.3
Under 40 years	84.1
Under 50 years	94.4

Unit–IV

Q. 7. Find the first three derivatives of the function tabulated, at the point x = 1.5 :

x	1.5	2.0	2.5	3.0	3.5	4.0
$y = f(x)$:	3.375	7.000	13.625	24.000	38.875	59.000

OR

Q. 8. Use Simpson's $\frac{1}{3}$rd rule to find $\int_0^{0.6} e^{-x^2} dx$ by taking seven ordinates.

Unit–V

Q. 9. Use Picard's method to solve $\frac{dy}{dx} = 1 + xy$, with $x_0 = 2$, $y = 0$.

OR

Q. 10. Use Euler's method to find y(0.4) from the differential equation $\frac{dy}{dx} = xy$, y(0 = 1). Take for each step h = 0.1.