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CS-71

BACHELOR OF COMPUTER APPLICATIONS (BCA) (Pre-Revised)

Term-End Examination, 2019

CS-71 : COMPUTER ORIENTED NUMERICAL TECHNIQUES

Time : 3 Hours **Maximum Marks : 75**

Note : Question **No. 1** is **Compulsory**. Attempt **any three** questions from question number 2 to 5. Use of scientific calculator is permitted.

1. (a) (i) If 0.667 is the approximate value of $\frac{2}{3}$, find the absolute, relative, and percentage errors. [3]

(ii) Round off the following numbers correct to four significant figures : [2]

98.3763 ; 799.252 ; 0.065738 ; 6657.692000

(b) If $f(x) = x^3$, find the value of $f[a,b,c]$ using divide and difference table. [5]

(c) Solve the following system of equations by using Cramer's rule : [5]

$$x + 2y + 3z = 6$$

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

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

(d) A river is 80 m wide. The depth 'd' in meters at a distance x metres from one bank is given by the following table :

x :	0	10	20	30	40	50	60	70	80
d :	0	4	7	9	12	15	14	8	3

Find approximate area of the cross-section by using Simpson's $\frac{1}{3}$rd rule. [5]

(e) Prove that $\mu^2 = 1 + \frac{1}{4}\delta^2$. [5]

(f) Discuss the merits and demerits of Direct and Iterative methods. [5]

2. (a) From the following table, find f(0.7) approximately by using Newton's backward formula : [5]

x	0.1	0.2	0.3	0.4	0.5	0.6
f(x)	2.68	3.04	3.38	3.68	3.96	4.21

(b) Solve the IPP $y' = 2y+3e^t$, $y(0)=0$ using classical R-K method of $O(b^4)$. [5]

(c) Find by Newton-Raphson method, the real root of the equation $xe^x=2$ correct to three decimal places. [5]

3. (a) Evaluate $\int_0^b \frac{1}{1+x^2} dx$ by Trapezoidal rule ; take h=1.0. [5]

(b) Find a root of the equation $x^3 - 4x - 9 = 0$ correct to 3 decimal places using Bisection method. [5]

(c) Find a real root of the equation $xe^x = \cos x$ correct to three decimals using fixed point method. [5]

4. (a) Solve the following system of linear equation by Gauss elimination method : [5]

$$2x - 6y + 8z = 24$$

$$5x + 4y - 3z = 2$$

$$3x + y + 2z = 16$$

(b) Solve the following system of linear equations by Gauss-Seide iterative method : [5]

$$x + 2y + z = 8$$

$$2x + 3y + 4z = 20$$

$$4x + 3y + 2z = 16$$

(c) Use Euler's method to approximate y when x = 0.1 given that $\frac{dy}{dx} = \frac{y - x}{y + x}$, given that y(0) = 1 by taking h = 0.05. [5]

5. (a) Solve the following system of linear equation by using Jacobi's iteration method : [5]

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

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

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

(b) Find an approximate value of the root of the equation $x^3 + x - 1 = 0$ near $x = 1$ using the Regula-Falsi method. [5]

(c) Apply Lagrange's interpolation formula, find f(x) from the following data : [5]

x	0	1	3	4
f(x)	-12	0	6	12

Also compute f(2.5).

----- x -----