Roll No. .....

1300 5/10/10/10

C-383

August 2022

Bachelor of Computer Applications (BCA) Examination

Fourth Semester

BCA-401 : COMPUTER ORIENTED NUMERICAL METHODS (USING "C" LANGUAGE)

Time 3 Hours] [Max. Marks 50
[Min. Marks 17

Note : Attempt any two sub-parts of a questions. All questions carry equal marks.

1. (a) What do you mean by Floating Point Numbers ? Add 122 and 22 using normalized floating point numbers.
   (b) Perform five iterations of the Bisection Method to obtain a root of the equation $f(x) = \cos x - x.ex.$
   (c) Explain Graffes Root Squaring Method.

2. (a) Employ the method of least square to fit a parabola $y = a + bx + cx^2$ in the following data :

   (x, y): $(-1, 2), (0, 0), (0, 1), (1, 2)$.

   (b) What do you mean by (i) conditional equation ? Explain with an example.
   (c) Solve the following system of linear equation by using Gauss Seidel Method :

   $$5x + 2y + z = 12$$
   $$x + 4y + 2z = 15$$
   $$x + 2y + 5z = 20.$$

3. (a) What do you mean by Forward Differences ? Construct forward difference table for following data :

x	:	0	5	10	15	20	25
y	:	7	11	14	18	24	32

   (b) Using Newton's Forward Interpolation Formula find the value of f (1.6), if :

x	:	1	1.4	1.8	2.2
y	:	3.49	4.82	5.96	6.5

   (c) Find $f(5)$ for the following data by using Lagrange's Interpolation Formula :

x	:	1	2	3	4	7
$f(x)$	:	2	4	8	16	128

4. (a) Explain general Quadrature Formula.
   (b) Find an approximation value of log 5 by calculating to 4 decimal places by Simpson's $\frac{1}{3}$ Rule. $\int_0^5 \frac{dx}{4x+5}$ dividing the range into 10 equal parts.
   (c) Find the third divided difference table with argument 2, 4, 9, 10 of the function $f(x) = x^3 - 2x$ and also find the value of $f(5)$ by using Newton's Divided Interpolation Formula.

5. (a) What do you mean by Picard's Method ? Explain in detail.
   (b) Given $\frac{dy}{dx} = \frac{y-x}{y+x}$ with the initial condition $y = 1$ at $x = 0$ find y for $x = 0.1$ by Euler's Method in 5 steps.
   (c) Solve the equation $\frac{dy}{dx} = -yx^2$ with $y(0) = 2$ by using Taylor's Series.
