

MCA 1st Semester Examination, 2013

**NUMERICAL ANALYSIS AND
STATISTICAL LAB.**

(Practical)

PAPER—CS/MCA-109(Gr.-B)

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate marks

*Candidates are required to give their answers in their
own words as far as practicable*

Illustrate the answers wherever necessary

Answer any one question (Lottery basis) : 15 × 1

1. Write a C program to find $f(x_i)$ by Lagrange interpolation formula from the data $\{x_i, f(x_i)\}$, $i = 1, 2, \dots, N$. Use it to find $f(15)$ from that data :

x	:	10	25	47	81
$f(x)$:	14.1321	17.2172	19.1729	21.1892

(Turn Over)

(2)

2. Write a C program to evaluate

$$\int_0^{12} \frac{dx}{4 + \sqrt{x}}$$

by Trapezoidal rule.

3. Write a C program to find the root of $3x - 3 \cos x - 7 = 0$ by Newton-Raphson method.

4. Write a C program to solve a system of linear equations by Gauss-Seidal method

$$10x - y - z = 13$$

$$x + 10y + z = 36$$

$$x + y - 10z = -35$$

5. Write a C program to find a real root of $x^3 - x - 1 = 0$ by Bisection Method.

6. Write a C program to evaluate

$$\int_0^5 \frac{dx}{1+x}$$

by Simpson's 1/3 rule.

7. Write a C program to compute $y(0.1)$, $y(0.2)$ and $y(0.3)$ using Euler's method of the following differential equation

$$\frac{dy}{dx} = xy + y^2, y(0) = 1$$

8. Write a C program to find the correlation coefficient of the following set of data :

x	1.53	1.78	2.60	2.95	3.42
y	33.50	36.30	40.00	45.80	53.50

9. Write a C program to fit a straight line $y = ax + b$ by the method of least squares to the following data :

x	0	5	10	15	20	25
y	10	14	19	25	31	36

10. Write a C program to find the SD and first four moments about mean for a discrete distribution. Test the program using the following :

30, 34, 10, 16, 30, 27, 33, 32, 22, 2, 6, 23, 25, 10, 8

11. Write a C program to evaluate $y(1.2)$ using Euler's method for the differential equation

$$dy/dx = 0.05x^2 - y^2 \text{ with } y(1) = 1 \text{ taking } h = 0.05$$

12. Write a C program to solve the following linear equations by Gauss Elimination method.

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

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

$$x + 4y + 9z = 16$$