MCA–108 **MCA–08**

M.C.A. DEGREE EXAMINATION – DECEMBER, 2018.

First Year

COMPUTER ORIENTED NUMERICAL METHODS

Time : 3 hours Maximum marks : 75

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1. Write short notes on sources of error.

2. Write the algorithm for solving a given equation by using bisection method.

3. Solve the system of equations $2x + y = 3$ and $7x - 3y = 4$ by using Gauss elimination method.

4. Find the smallest positive root of the equation $2x^2 - 3x - 6 = 0$ by using Newton–Raphson method.

5. Find a second degree polynomial which best fit the data (1, 4), (2, 5) and (4, 13) by using Lagrange's interpolation Formula.

6. Fit a Straight line to the data given below by using the method of least squares.

x	0	1	2	3	4
y	1	0.8	3.3	4.5	6.3

7. Evaluate $\int_0^6 (1/(1+x))dx$ by using Simpson's 1/3rd rule (Use $h = 1$).

PART B — ($5 \times 10 = 50$ marks)

Answer any FIVE questions.

8. Find a root which lies between 1 and 2 of $x^3 + 2x^2 + 10x - 20 = 0$ by using Regula-falsi method.

9. Using Gauss Jordan method Solve the system of equations $10x + y + z = 12$; $2x + 10y + z = 13$ and $x + y + 5z = 7$.

10. Solve the system of equations $10x - 5y - 2z = 3$; $4x - 10y + 3z = -3$ and $x + 6y + 10z = -3$ by using Gauss Seidel iterative method.

11. Using Newton's divided difference formula find the polynomial to the given data

x	–1	0	1	3
$y = f(x)$	2	1	0	–1

12. From the following table of half - yearly premium for policies maturing at different ages estimate the premium for policies maturing at age x = 63 by using Newton's backward interpolation formula.

Age x	45	50	55	60	65
Premium	114.84	96.16	83.32	74.48	68.48

13. Evaluate the value of $\int_0^1 \left(1/(1+x^2)\right)dx$ by using Trapezoidal rule (Take h = 0.2).

14. Use Runge-Kutta method to find y at $x = 0.1$, given $dy/dx = y - x$, $y(0) = 2$.

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