MCA–758 **MCA-08**

M.C.A. DEGREE EXAMINATION – JUNE 2010.

First Year

COMPUTER ORIENTED NUMERICAL METHODS

Time : 3 hours Maximum marks : 75

PART A — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

1. Write about numbers and their accuracy.

2. Describe the method of false position.

3. Find, by Newton's method, the root of the equation $e^x = 4x$, which is approximately 2, correct to three decimal places.

4. Solve by Gauss-elimination method :

$$2x + y + 4z = 12$$
$$8x - 3y + 2z = 20$$
$$4x + 11y - z = 33.$$

5. Describe the Gauss-Jacobi method.

6. Given the data :

x :	0	1	2	5
$f(x)$:	2	3	12	147

Find the cubic function of x.

7. Solve the equation $\frac{dy}{dx} = 1 - y$ with the initial condition $x = 0$, $y = 0$, using Euler's algorithm find the solution at $x = 0.1$ and 0.2.

PART B — ($5 \times 10 = 50$ marks)

Answer any FIVE questions.

8. Find the root of equation $x^3 - 4x - 9 = 0$ correct to three decimal places by using the bisection method.

9. Show that the equation $x^3 - 3x + 1 = 0$ has a root between 1 and 2. Calculate it to three decimal places using Horner's method.

10. Solve by Gauss-Jordon method :

$5x - 2y + 3z = 18$
$x + 7y - 3z = -22$
$2x - y + 6z = 22.$

11. Solve by Gauss-Seidel method of iteration :

$27x + 6y - z = 85$

$6x + 15y + 2z = 72$

$x + y + 54z = 110$

12. Compute $f(0.9)$ by Newton-Gregory backward difference interpolation formula from the data :

x :	0	0.2	0.4	0.6	0.8	1.0
$f(x)$:	1	1.16	3.56	13.96	41.96	101

13. Dividing the range into 10 equal parts, find the approximate value of $\int_0^{\pi} \sin x \, dx$ by

(a) Trapezoidal role and

(b) Simpson's 1/3 rule.

14. Apply the fourth order Runge-Kutta method, to find an approximate value of y when $x = 0.2$ and $h = 0.1$, given that $y' = x + y, \; y(0) = 1$.

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