MCA–133 MCA-08

M.C.A. DEGREE EXAMINATION – JANUARY 2009.

Second Semester/First Year

COMPUTER ORIENTED NUMERICAL METHODS

Time : 3 hours Maximum marks : 75

Answer for 5 marks question should not exceed 2 pages.

Answer for 10 marks questions should not exceed 5 pages.

PART A — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

1. Describe the different types of errors.

2. Find the positive root of $f(x) = 2x^3 - 3x - 6 = 0$ by Newton-Raphson method correct to 4 decimal places.

3. Describe the bisection method.

4. Solve the system of equation by Gauss-Jordan method. $x + 2y + z = 3$; $2x + 3y + 3z = 10$; $3x - y + 2z = 13$.

5. Show by Jacobi iteration :

$$14x_1 - 3x_2 = 8$$
$$x_1 + 5x_2 = 11.$$

6. Find the Cubic polynomial which takes the following values :

$y(0) = 1$, $y(1) = 0$, $y(2) = 1$ and $y(3) = 10$.

7. Derive the Trapezoidal rule.

PART B — ($5 \times 10 = 50$ marks)

Answer any FIVE questions.

8. Assuming that a root of $x^3 - 9x + 1 = 0$ lies in the interval $(2, 4)$ find the root of Bisection method.

9. Solve by Gauss-Elimination method :

$3x + 4y + 5z = 18$; $2x - y + 8z = 13$;
$5x - 2y + 7z = 20$.

10. Solve by Gauss-Seidel method, the following system :

$28x + 4y - z = 32$; $x + 3y + 10z = 24$;
$2x + 17y + 4z = 35$.

11. The table below gives the values of tan x for $.10 \le x \le \cdot 30$.

x :	0.10	0.15	0.20	0.25	0.30
$y = \tan x$:	0.1003	0.1511	0.2027	0.2553	0.3093

Find :

(a) tan 0.12

(b) tan 0.26.

12. Evaluate $I = \int_0^1 \frac{dx}{1+x^2}$ with $h = \frac{1}{6}$ by

(a) Trapezoidal rule

(b) Simpson's $\frac{1}{3}$ rule.

13. Compute y for $x = 0.2$ and 0.4 given $y' = y - \frac{2x}{y}; y(0) = 1$.

14. Find the positive root of $x^3 = 2x + 5$ by False Position Method.
