2050 MCA–08

M.C.A. DEGREE EXAMINATION–JANUARY, 2006.

Second Semester

COMPUTER ORIENTED NUMERICAL METHODS

Time : 3 hours Maximum marks : 75

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1. Convert the following into binary :

(a) 17.375.

(b) 0.2.

2. List some pitfalls in computing when computer arithmetic is used.

3. Solve the quadratic equation $x^2 - 5x + 6 = 0$ using Newton Raphson method.

4. Solve the following equations using Gauss seidal iterative method.

$$3x_1 + 2x_2 = 7$$
$$2x_1 + 3x_2 = 8.$$

5. Explain the Lagrange's method of interpolation.

6. Fit a straight line for the table given below :

x :	1	2	4	5	6	8	9
y :	2	5	7	10	12	15	19

7. Explain numerical differentiation with an example.

PART B — ($5 \times 10 = 50$ marks)

Answer any FIVE questions.

8. Express the following binary numbers in decimal, octal and hexadecimal :

(a) 1011.1101

(b) 1110111.00111.

9. Find the smallest positive root of the following equation using secant method :

$f(x) = x^3 - 3x^2 + x + 1 = 0.$

10. Explain the Gauss Elimination method.

11. Using the Least Square method fit a curve for $f(x)$:

x :	1	2	3	4	5	6	7	8	9
$f(x)$:	3	7	13	21	31	43	57	73	91

12. The population of a city in a census taken once in ten years is given below. Estimate the population in the years 1925, 1975 and 1984 :

Year :	1921	1931	1941	1951	1961	1971	1981
Population in thousands :	35	42	58	84	120	165	220

13. Solve the following differential equations using Runge-Kutta method :

$$\frac{dy}{dx} = 2xy, \quad y(0) = 0.5 \text{ for } 1 \geq x \geq 0.$$

14. Explain the Gaussian quadratic formula using a suitable example.

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