MCA–648   MCA-08

M.C.A. DEGREE EXAMINATION – JUNE 2008.

First Year/Second Semester

COMPUTER ORIENTED NUMERICAL METHODS

Time : 3 hours   Maximum marks : 75

Answer for 5 marks questions should not exceed
2 pages.

Answer for 10/15 marks questions should not exceed
5 pages.

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1.   Explain Secant method for solving non-linear equations.

2.   Derive the iterative formula to compute the square root of a positive number.

3.   Compare direct and iterative methods to solve the system of Linear Equations.

4. Solve by Cramer's rule :

$$x + 4y = 5$$
$$2x - y = 1$$.

5. What is inverse interpolation? Explain.

6. Explain the principle of least squares.

7. Write the formula of R-K methods upto Fourth Order.

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

8. Find a root of the equation $x \log_{10} x = 1.2$ by Newton's method.

9. Find a root of the equation, by bisection method :

$$3x = \cos x + 1.$$

10. Solve the system of equations.

$$10x + y + z = 12$$
$$x + 10y + z = 12$$
$$x + y + 10z = 12$$, by Gauss Elimination Method.

11. Solve by Gauss-Seidel method :

$$10x - 5y - 2z = 3$$
$$4x - 10y + 3z = -3$$
$$x + 6y + 10z = -3.$$

12. Using Lagrangels formula, fit a polynomial to the following data.

x	-1	0	2	3
y	-8	3	1	12

Hence find y (1).

13. Evaluate $\displaystyle\int_0^6 \frac{dx}{1+x^2}$ by Simpson's 1/3 rule and $3/8$ rule.

14. Solve $\dfrac{dy}{dx} = \dfrac{y^2 - x^2}{y^2 + x^2}$ for $x = 0.2,\ 0.4$ given $y(0) = 1$, using R-K method of fourth order.

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