

**FOURTH SEMESTER M.Sc DEGREE (MATHEMATICS) EXAMINATION,
JUNE 2012
(CUCSS-PG-2010)**

MT4E07 COMPUTER ORIENTED NUMERICAL ANALYSIS

MODEL QUESTION PAPER

Time: 1½ hours

Total weightage: 18

Part A

(Short Answer Type Questions)

Answer all questions. Each question has 1 weightage

1. What is a header file? Give one example.
2. Give an account of the numerical data types in C++ with their ranges.
3. What is recursion of functions? Give an example
4. Write a programme to find the big of three given numbers
5. If $f(0) = 5$, $f(3) = 14$, $f(6) = 41$ and $f(8) = 69$, use Lagrange's interpolation formula to evaluate $f(7)$.
6. If $f(0) = .01$, $f(.2) = .05$, $f(.4) = .08$, $f(.6) = .014$, $f(.8) = .06$ and, $f(1) = .03$, use trapezoidal rule to find $\int_0^1 f(x)dx$.

(6 x 1 = 6)

Part B

(Paragraph Type Questions)

Answer any four questions from this part. Each question carries 2 weightage

7. Write a programme that evaluates the Totient function
8. Write a programme that finds the maximum and the average of a set of n numbers
9. If $f(a) < 0$ and $f(b) > 0$, for a continuous function f, write a programme to find an approximate root between a and b with required accuracy of three decimal.
10. From the following table find $\frac{dy}{dx}$ at $x = 1.2$

| x | y |
|-----|--------|
| 1.0 | 2.7183 |
| 1.2 | 3.3201 |
| 1.4 | 4.0552 |
| 1.6 | 4.9530 |

11. Find the inverse of the matrix $\begin{bmatrix} 2 & 1 & 1 \\ 3 & 2 & 3 \\ 1 & 4 & 9 \end{bmatrix}$ using Gauss Method

12. Use Euler's method to find $y(0.1)$ with $h=0.02$, given $\frac{dy}{dx} = x^2 + y$ and $y(0) = 1$.

(4 x 2 = 8)

Part C

(Essay Type Questions)

Answer any one question. Each question carries 4 weightage

13. a). Write a programme for Lagrange's interpolation formula.

b) . Use Runge Kutta 4th order method to evaluate $y(0.2)$ with $h = 0.1$, given $\frac{dy}{dx} = y - x$ and $y(0) = 2$

14. Use Gauss Seidel iteration method to find approximate solution to the following system in 2 iterations

$$10w - 2x - y - z = 3$$

$$- 2w + 10x - y - z = 15$$

$$- w - x + 10y - 2z = 27$$

$$- w - x - 2y + 10z = -9$$

(1 x 4 = 4)