M – 204 NR

M.Sc. DEGREE EXAMINATION
MODEL QUESTION PAPER
(w.e.f. the bathch of students admitted during 2011-2012)
Second Semester
Mathematics
Paper – IV COMPUTER ORIENTED NUMERICAL METHODS

Time: Three hours **Maximum : 80 marks**

Answer ONE question from each Unit.
Question No.1 is compulsory.
All questions carry equal marks.

1. a) What are the uses of functions?

   b) What is an array? How it is declared?

   c) What is a string constant?

   d) What is a structure?

   e) Find the approximate Value of $I = \int_0^1 \frac{dx}{1+x}$ by using Trapezoidal rule

   f) From the following table find an approximate value of f (2.0)

x	f (x)
2.0	0. 69315
2.2	0.78846

   g) Explain Backward Euler's method of solving an initial value problem

   h) Write the formula for Runge – Kutta second order method

UNIT – I

2. a) Write notes on data types supported by C ?

   b) Write a program to find standard deviation of a given sequence?

3. a) Write notes on operator precedence and associativity?

   b) Write a program to check given string is porindrome or not ?

UNIT – II

4. a) Write notes on storage classes in C ?

   b) Write a program to find n fibinocci numbers using functions?

5. a) Distinguish between structures and unions? Define pointers?

   b) Write a program to find the sum of complex numbers?

UNIT – III

6. a) Explain
   (i) Lagrange and

   (ii) Newton interpolations

   b) Find the unique polynomial P (x) of degree 2 or Less such that P (1) =1, P(3)=27 and P(4) =64 using
   (i) Lagrange interpolation
   (ii) Newton divided difference formula

7. a) Explain Hermite interpolation

   b) Using the following values of f (x) and f ' (x)

x	f (x)	f ' (x)
-1	1	-5
0	1	1
1	3	7

   Estimate f (-0.5) and f(0.5) using the Hermite interpolation.

UNIT – IV

8. a) Evaluate the integral
   $I = \int_0^1 \frac{dx}{1+x}$ by using Gauss – Legendre three point formula

   b) Find an approximate value of $I = \int_0^1 \frac{dx}{1+x}$ using composite trapezoidal rule with 2,3,5,9 nodes.

9. a) use the Euler method to solve numerically the initial value problem $u' = -2tu^2$, $u(0) = 1$ with $h = 0.2$ on the interval [0,1].

   b) Given that $u' = -2tu^2$, $u(0) = 1$, obtain $u(0.2)$ with $h = 0.1$, using Runge – Kutta method of 4^{th} order.