MCA
MCC-205

Fourth Semester Special Examination, 2012
COMPUTER BASED NUMERICAL METHOD
Time : 3 Hours
Full Marks : 70

Answer question No.1 which is compulsory and any five from the rest.
The figures in the right – hand margin indicate marks.

Q.1. Answer the followings 2X10

a) Write the different sources of error in numerical computation.

b) Explain the rate of convergence of regula falsi method

c) What is the stability condition of a linear system of equations.

d) Write the condition of convergence of Gauss Seidel method.

e)Write the advantages and disadvantages of Lagranges method of interpolation.

f) Find $\Delta^2 5, \nabla^2 8$ *fromthe following data*

x	0	2	4	6
y	2	5	8	14

g) What is the error in Simpson's 3/8 rule.

h) Explain predictor corrector method giving suitable example.

i) Write Adam-Moulton predictor corrector 3rd order formula to solve the initial value problem

j) Write the error in Euler's modified method.

Q.2.a) Find the root of equation $\sin x - xe^x = 0$ using fixed point iteration method.

b) Find the rate of convergence of Newton–Raphson method to find the solution of an equation..

Q.3. a)) Find the inverse of matrix $\begin{bmatrix} 1 & 10 & 1 \\ 10 & 1 & -1 \\ -1 & 1 & 10 \end{bmatrix}$ using Gauss Jordan method.

b) Solve the following system of equations using Gauss Jacobi method,

$$4x + y + 2z = 4$$

$$3x + 5y + z = 7$$

$$x + y + 3z = 3$$

Q.4. a) Find f(0.5) and f(3.5) using Newton divide difference interpolation method of the following data

x	-2	0	1	3	4
y	-23	1	4	82	193

b) Using inverse interpolation , find f(6) of the following data

x	2	4	5
y	5	9	14

Q. 5. a) Find f'(1) , f'(3) from the following data using Newton's finite difference method

x	-1	0	1	2	3
f(x)	0.333	1	3	9	27

b) Evaluate $I = \int_1^2 \frac{2x^2}{1+x^4} dx$, using Simpson's 1/3rd rule.

Q.6 .a) Evaluate $I = \int_0^{\pi/2} \sin x dx$, using Simpson's 3/8 rule.

b) Evaluate $I = \int_{-1}^{1} e^x \cos x dx$ using Gauss 3-point formula.

Q. 7. a) Solve $dy/dx = y + x^2$, $y(0)=1$ using Taylor's series method in the interval [0 , 0.4].

b) Find the value of y(1.2) where $dy/dx = \sqrt{x+y}$, $y(0.4)=0.41$ using Modified Euler's Method

Q.8.a)Write the algorithm to find the solution of a differential equation using Runge-Kutta method of 4th order.

b) Write the algorithm to solve the following equation by using Adam-Bashforth 3rd order method

$dy/dx = \frac{1}{1+x^2}$,$y(0) = 1$ in the interval [0,1].