2007

Subject Code—7217

M.C.A. (Third Year) EXAMINATION

(5 Years Integrated Course)

MATHEMATICS-III

MCA-305

Computer Oriented Numerical and Statistical

Methods Using C

Time: 3 Hours Maximum Marks: 100

Note: Attempt any *Five* questions. All questions carry equal marks.

- 1. (a) Explain the fixed point and floating point representations of numbers. Give examples.
 - (b) Describe the normalized floating representation of numbers. Also, give the disadvantages of floating point representation.

- (c) (i) Multiply the numbers 0.6644E15 and 0.2311E13.
 - (ii) Multiply the numbers 0.4454E23 and 0.1456E-45.
 - (iii) Divide the number 0.8888E-5 by 0.2000E-03.
- 2. (a) Find a root of the equation $x^3 4x 9 = 0$ using the bisection method correct to three decimal places.

10

(b) Find the quadratic factor of the polynomial given by:

$$f(x) = x^3 - 2x^2 + x - 2$$

using Bairstow's method.

10

3. (a) Apply Gauss-Seidal iteration method to solve the equations:

$$20x + y - 2z = 17$$

$$3x + 20y - z = -18$$

$$2x - 3y + 20z = 25$$

(b) Given:

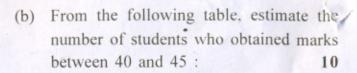
$$\frac{dy}{dx} = \frac{y - x}{y + x}$$

with initial condition y = 1 at x = 0; find y for x = 0.1 by Euler's method. 10

- 4. (a) Find the first and second derivatives of the function tabulated below, at the point x = 1.2:
 10
 x : 1.0 1.2 1.4 1.6 1.8 2.0
 f(x) : 0 0.128 0.544 1.296 2.432 4.00
 - (b) Calculate the value of $\int_0^{\pi/2} \sin x \, dx$ by Simpson's $\frac{1}{3}$ rule, taking 10 intervals. 10
- 5. (a) Given the values of: 10

f(x): 150 392 1452 2366 5202

Evaluate f(9), using Lagrange's formula.



Marks	No. of Students
30-40	31
40—50	42
5060	51
60—70	35
70—80	31

6. (a) Fit a second degree parabola to the following data:

 $x: 1.0 \quad 1.5 \quad 2.0 \quad 2.5 \quad 3.0 \quad 3.5 \quad 4.0$

 $v: 1.1 \ 1.3 \ 1.6 \ 2.0 \ 2.7 \ 3.4 \ 4.1$

(b) Economize the power series: 10

$$\sin x \approx x - \frac{x^3}{6} + \frac{x^5}{120} + \frac{x^7}{5040}.$$

- 7. (a) Explain the following:
 - (i) Sampling distribution
 - (ii) Testing of hypothesis
 - (iii) Test of significance
 - (iv) Degree of freedom. 10

(b) A sample of a 20 item has mean 42 units and S.D. 5 units. Test the hypothesis that it is a random sample from a normal population with mean 45 units.

(Given, the tabulated value of t at 5% level of significance for 19 d.f. is $t_{0.05} = 2.09$).

8. (a) The varieties A, B, C of wheat were sown in 4 plots each, and the following yield in quintals per acre were obtained:

A 8 4 6 7 B 7 5 5 3

Test the significance of difference between the yield of varieties, given that $F_{tab}(2, 9)$ at 5% level of significance is 4.26.

(b) What is meant by trend of time series?

What are the various methods formeasurment of trends? Explain. 10