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. 7

   (b) Describe the normalized floating representation of numbers. Also, give the disadvantages of floating point representation. 7

(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. **6**

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 : **10**

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

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

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

(b) Given :

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

with initial condition $y = 1$ at $x = 0$; find y for $x = 0{\cdot}1$ by Euler's method. **10**

4. (a) Find the first and second derivatives of the function tabulated below, at the point $x = 1{\cdot}2$: **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**

x	5	7	11	13	17
$f(x)$	150	392	1452	2366	5202

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

(b) From the following table, estimate the number of students who obtained marks between 40 and 45 : **10**

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

6. (a) Fit a second degree parabola to the following data : **10**

x : 1·0 1·5 2·0 2·5 3·0 3·5 4·0

y : 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 $t_{0·05} = 2·09$). **10**

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
C	2	5	4	4

Test the significance of difference between the yield of varieties, given that $F_{tab}(2, 9)$ at 5% level of significance is 4·26. **10**

(b) What is meant by trend of time series ? What are the various methods for measurment of trends ? Explain. **10**