MCA/D-15 **10613**

COMPUTER ORIENTED NUMERIC AND STATISTICAL METHODS

Paper—MCA-14-15

Time Allowed : 3 Hours] [Maximum Marks : 80

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Define Algebraic and transdental equations with examples.

   (b) Define interpolation with examples.

   (c) Discuss the superiority on Runge-Kutta method in Taylor-Series.

   (d) Write the noymal equations of Parabola of second degree.

   (e) Define Frequency distribution with suitable examples.

   (f) Define Range with suitable examples.

   (g) Explain sample distribution in brief.

   (h) Define t test in brief. $2 \times 8 = 16$

UNIT-I

2. (a) The equation $x^6 - x^4 - x^3 - 1 = 0$ has one root between 1.4 and 1.5. Find the root to four decimal places by False position method.

   (b) Show that the convergence of Newton-Raphson method is quadratic.

3. (a) Solve the following system of equations by Gauss-seidal iterative method :

$$8x + 15y + 2z = 72$$

$$27x + 6y - z = 85$$

$$x + y + 54z = 110.$$

   (b) Find the form of function $F(x)$ from the following data and obtain $F(5)$ by Langrange's formula.

x	:	1	3	4	6	10
F(x)	:	0	18	48	180	900

UNIT-II

4. (a) Use Runge-Kutta method to approximate y, when $x = 0.1$ given that $x = 0$ when $y = 1$ and

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

   (b) Find $\frac{d}{dx}[F(x)]$ at $x = 10$ from the following data:

x	:	3	5	11	27	34
F(x)	:	-13	23	899	17315	35606

5. (a) Evaluate $\int_0^1 \frac{dx}{(1+x^2)}$ by using Simpson's $\frac{'1'}{3}$ and $\frac{'3'}{\theta}$ rule. Hence obtain the approximate value of π in each case.

   (b) Fit a straight line to the given data :

x :	1	2	3	4	5	6
y :	1200	900	600	200	110	150

UNIT–III

6. (a) Define Chebyshev polynomial and its types.

   (b) Find the Mode of the following frequency distribution :

Size (x)	Frequency (f)
1	3
2	8
3	15
4	23
5	35
6	40
7	32
8	28

Size (x)	Frequency (f)
9	20
10	45
11	14
12	6

7. (a) What do you understand by Skewness? How is it measured? Distinguish clearly by figures, between positive and negative skewness.

(b) Write short notes on the following :

(i) Bionomial distribution.

(ii) Regression.

UNIT–IV

8. (a) The following figures show the distribution of digits in numbers Chosen at random from a telephone directory :

Digits	Frequency
0	1026
1	1107
2	997
3	966
4	1075
5	933
6	1107

Digits	Frequency
7	972
8	964
9	853
Total	10,000

Test whelther the digits may be taken to occur equally fequently in directory the tabulated value on χ^2 for 9 d.f. = (16.919)

(b) What is "Analysis of Variance" and where is it used? Discuss it.

9. (a) What is meant by a Time series? Discuss its importance in business and economics.

(b) Write short notes on the following :

(i) Cyclic movement

(ii) ANOVA Table.