

Exam. Code : 103203

Subject Code : 1098

B.A./B.Sc. 3rd Semester

COMPUTER SCIENCE

(Computer Oriented Numerical and
Statistical Methods)

Time Allowed—3 Hours]

[Maximum Marks—75

Note :— Attempt any *five* questions. All questions carry equal marks.

1. (a) Differentiate among Truncation Error, Round off Error, Absolute Error and Relative Error, by taking examples. Explain error propagation with respect to Multiplication and Division.
- (b) Explain Newton-Raphson method for solving an algebraic equation. A graph of $x^3 - 2x - 5 = 0$ indicates there is a root close to $x = 2$. Use Newton's method (aka Newton-Raphson method), to find the next approximation, x_2 , given that our first guess of the root is $x_1 = 2$. 8,7
2. (a) Compare direct methods and iterative methods for solving system of simultaneous linear equations.

- (b) Solve the system of following equations using Gauss Elimination method :

$$3x + 2y + z = 3$$

$$2x + y + z = 0$$

$$6x + 2y + 4z = 6 \quad 3,12$$

3. What is the significance of numerical integration ? Name various techniques for numerical integration. Evaluate the following definite integral using Simpson's $1/3^{\text{rd}}$ rule by dividing the range into 10 equal parts :

$$\int_0^5 \frac{dx}{4x+5} \quad 15$$

4. (a) What is interpolation ? Explain the utility of various data interpolation techniques.
(b) Find $f(7.5)$ using Newton's backward difference formula for the following data :

x	f(x)
1	1
2	8
3	27
4	64
5	125
6	216
7	343
8	512

6,9

5. (a) What is frequency distribution in statistics ? Give an example.
- (b) Define the mean, median and mode. When will they all have the same values ? How do they differ when the distribution of a variable is skewed to the right ?
- (c) The mean of a set of 75 observations, was calculated as 80.4. It was later discovered that an item of value 96 was wrongly taken as 26. Determine the correct mean. 5,5,5
6. (a) What do skewness and kurtosis measure ? How do you interpret these ? Explain with diagrams.
- (b) Determine the mean deviation and standard deviation of the data in the following table. Round your answers to the nearest tenth :

Data Value	Frequency
25	3
27	2
31	4
35	1
36	2

5,10

7. Define correlation and regression and bring out the differences between the two. For the following data, obtain the two lines of regression :

X	Y
165	173
160	168
170	173
163	165
173	175
158	168
178	173
168	165
173	180
170	170
175	173
180	178

15

8. (a) What is bivariate and multivariate distribution ? Explain.
- (b) Find the least square line $y = a + bx$ for the data points :
- (-1, 10), (0, 9), (1, 7), (2, 5), (3, 4), (4, 3), (5, 0)
and (6, -1) 5,10