Exam. Code : 105702
Subject Code : 1532

B.Sc. (Information Technology) Semester—II

Paper-V : NUMERICAL METHODS AND STATISTICAL TECHNIQUES

Time Allowed—3 Hours] [Maximum Marks—75

Note : Attempt any **FIVE** questions. All questions carry equal marks. The use of non-programmable and non-storage type calculator is allowed.

1. (a) What are Numerical Methods ? Differentiate between numerical methods and numerical analysis.

   (b) Define and compare absolute and relative errors.

2. Describe Newton-Raphson method to solve a transcendental equation. How is this method better than Bi-section method ?

3. Solve the following set of simultaneous algebraic equations using the Gauss elimination method :

$$2x_1 + 4x_2 + 2x_3 = 15$$
$$2x_1 + x_2 + 2x_3 = -5$$
$$4x_1 + x_2 - 2x_3 = 0.$$

4. Write the procedure for Simpson's 3/8 rule. Integrate the function $5x^3 - 3x^2 + 2x + 1$ from $x = -1$ to $x = 1$ using Simpson's rule with $h = 1$.

5. Fit a straight line to the following data regarding x as the independent variable :

x	0	1	2	3	4
y	1.0	1.8	3.3	4.5	6.3

Hence find the difference between the actual value of y and the value of y obtained from the fitted curve when $x = 3$.

6. (a) What is the relationship between mean, median and mode ? Justify with an example.

(b) The following data relates to the performance of students in two Sections A and B in a preparatory examination :

Section	Mean Marks	Standard Deviation
A	43	5
B	41	1.5

The minimum pass marks in the examination are 36. Which Section needs greater attention for preparing for annual examination, if marks are assumed to be normally distributed ?

7. Define Dispersion. What are the various measures of dispersion ? Explain each in detail with examples and differentiate between them.

8. Write short notes on the following :.

   (a) Difficulties of multiple roots

   (b) Divided Difference method

   (c) Polynomial fit.