

D-26/2056

COMPUTER ORIENTED NUMERICAL AND
STATISTICAL METHODS-224

Semester-IV

RanbirCollege.eu5.org

Time Allowed : Three Hours]

[Maximum Marks : 75

Note:- The candidates are required to attempt *two* questions each from Sections A and B carrying 15 marks each and the entire Section C consisting of 6 short answer type questions carrying 15 marks in total.

SECTION-A

- I. Discuss various arithmetic operations with normalized floating point numbers. Use examples for explanation. 15
- II. Give geometrical interpretation of Newton-Raphson method and apply this method to find the root of the equation $x^3 - x^2 - x - 3 = 0$ correct to three places of decimals. 15
- III. Solve $x^3 - 9x + 1 = 0$ for the root lying between 2 and 4 by the method of false position. 15
- IV. Solve the system of equations by Gauss-Seidel method :
$$27x + 6y - z = 85$$
$$6x + 15y + 2z = 72$$
$$x + y + 54z = 110$$
 15

SECTION-B

V. (a) Using Newton's divided difference formula, prove that :

$$f(x) = f(0) + x \Delta f(-1) + \frac{(x+1)x}{\underline{2}} \Delta^2 f(-1) + \frac{(x+1)x(x-1)}{\underline{3}} \Delta^3 f(-2) + \dots$$

(b) Find by Lagrange's formula to find the value of $f(5)$ if $f(0) = 1, f(3) = 19, f(4) = 49, f(6) = 181$. 15

VI. (a) The following figures represent the number of books issued at the counter of a commerce college library on 12 different days : 96, 180, 98, 75, 270, 80, 102, 100, 94, 75, 200, 160. Calculate the arithmetic mean, median and mode for this data. Which of these would represent the above data best ?

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

X :	1	2	3	4	6	8
Y :	2.4	3	3.6	4	5	6

15

VII. Write down the algorithm to compute Karl Pearson's correlation. How do you interpret a calculated value of Karl Pearson's coefficient of correlation ? Discuss in particular the values of $r = 0$, $r = -1$ and $r = +1$. 15

VIII. If the two lines of regression are $4x - 5y + 30 = 0$ and $20x - 9y - 107 = 0$ which of these is the line of regression of x on y . Find r_{xy} and σ_y when $\sigma_x = 3$. 15

SECTION-C

- a) What is an overflow condition ? Explain with example. 2
- b) Convert 17.375 to binary. 2
- c) What do you understand by ill-conditioned equations ? Explain with example. 3
- d) What do you mean by regression ? Why are there two lines of regression in case of a bivariate series ? 3
- e) The correlation coefficient between two variables must be in the same units as the original data, state, giving reasons, whether the given statement is true or false. 3
- f) Can the values of mean, mode and median be same ? If yes, state the situation. 2