BCA/M-18   **19003**

COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS

Paper : BCA-103

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all. Question No. 1 is compulsory. In addition to that attempt *four* more questions, selecting *one* question from each unit. All questions carry equal marks.

Compulsory Question

1. (a) Give the representation of a real number 0.625 in a computer using single precision IEEE format.

 (b) Write the formula for Langrange's Interpalation. Using Langrange's Interpalation find $f(3.5)$ for the following tables of values :

x	:	1	2	3	4
$f(x)$	:	1	8	27	64

 (c) Find the Arithmetic Mean (AM) of the marks obtained by 9 students of a class given below 52, 40, 70, 43, 75, 40, 48, 35, 65.

 (d) Find cov(x, y), if $\Sigma x_i = 60$, $\Sigma y_i = 95$, $\Sigma x_i y_i = 574$, $n = 10$.

 (4,4,4,4)

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9. (a) Define student's test and its important properties.

 (b) Explain the difference between parametric and non-parametric tests.   (8,8)

UNIT–I

2. (a) Divide 0.5765E7 by 0.2532E5.

   (b) Calculate the value of $(1 + x)^2$ and $(x^2 + 2x) + 1$ when $x = 0.4999\text{E}(-2)$. Find the relative errors in two methods of calculating the expression. Which is preferred method.

   (8,8)

3. (a) Find the root of $x^2 - 2x + 5 = 0$ using Newton-Raphson method correct to three decimal places.

   (b) Apply Euler's method to find an approximate value of y corresponding to $x = 0.1$ with 4 sub-divisions, given that

   $$\frac{dy}{dx} = x - y^2 \text{ and } y = 1 \text{ at } x = 0.$$

   (8,8)

UNIT–II

4. (a) State and prove Newton-Gregory formula for Backward interpolation.

   (b) Determine the polynomial of second degree, which is the best approximation to $\sqrt{x}$ on the point set

   $$\left\{0, \frac{1}{9}, \frac{4}{9}, 1\right\}$$

   (8,8)

5. (a) Evaluate $\int_0^1 \frac{1}{1 + x^2}\, dx$ using Simpson's $\frac{1}{3}$rd rule taking

   $h = \frac{1}{4}$.

(b) Find the first derivative of the function tabulated below at the point $x = 1.1$:

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

(8,8)

UNIT–III

6. (a) If arithmetic mean and geometric mean of two values are 10 and 8 respectively. Find the two values.

   (b) Find the variance and standard deviation for the following data :

x_i	4	8	11	17	20	24	32
f_i	3	5	9	5	4	3	1

(8,8)

7. (a) Find the corrected values of the following moments using Sheppards correction. The width of classes in the distribution is 10 and $\mu_2 = 113.72$, $\mu_3 = -8.11$, $\mu_4 = 35225$.

   (b) Find the probability distribution of the number of sixes in three tosses of a die. Find also the mean and the variance.

   (8,8)

UNIT–IV

8. (a) What do you mean by correlation ? Explain various method to study correlation.

   (b) Find the regression coefficint of y on x for the data : $\Sigma x = 24$; $\Sigma y = 44$; $\Sigma xy = 306$; $\Sigma x^2 = 164$; $\Sigma y^2 = 574$; $n = 4$.

   (8,8)