c) By using Lagrange's inverse interpolation formula compute x when y = 13.5 **4**

x	93.0	96.2	100.0	104.2	108.7
y	11.38	12.80	14.70	17.07	19.91

9. a) State and explain Simpson's $1/3^{rd}$ rule. Evaluate. **6**

$$\int_0^6 \frac{dx}{1+x}; h = 1$$

b) State and prove trapezoidal rule of numerical integration. **6**

OR

10. a) State and explain Simpson's $\frac{3}{8}^{th}$ rule. **6**

Evaluate.

$$\int_4^{5.2} \log_e x \, dx \text{ for } h = 0.2.$$

b) State the trapezoidal rule. Evaluate. **6**

$$\int_0^{\pi} \sin x \, dx \text{ for } h = \frac{\pi}{10}$$

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B.C.A. Part - I Semester - II

Numerical Methods Paper - 2ST4

P. Pages : 4

Time : Three Hours Max. Marks : 60

Notes : 1. All questions carry equal marks.
2. All questions are compulsory.

1. a) Explain the method of least square. **4**

b) Explain what do you mean by polynomial regression. **4**

c) Fit straight line to the following set of data using linear regression method. **4**

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

OR

2. a) Obtain normal equation for fitting of straight line. **4**

b) Explain how multiple regression can be used to forecast values of the dependent variable. **4**

c) Fit a second order polynomial to the data in the table given below **4**

X	1.0	2.0	3.0	4.0
Y	6.0	11.0	18.0	27.0

3. a) Explain the principle of linear least square. **4**

b) Explain what is transcendental Equation. **4**

c) Fit the power equation $y = ax^b$ to the data below. **4**

X:	2	4	6	8
Y:	1.4	2.0	2.4	2.6

OR

4. a) Explain what is non linear regression. **4**

b) Explain how will you reduce $y = ax^b$ to linear form. **4**

c) Fit the curve $y = ae^{bx}$ to the following data. **4**

X:	1	2	3	4
Y:	1.65	2.70	4.50	7.35

5. a) State Newton Gregory forward interpolation formula. In which case it is useful? **6**

b) By using forward interpolation formula compute y at x = 21. **6**

X:	20	23	26	29
Y:	0.3420	0.3907	0.4384	0.4848

OR

6. a) Derive the Newton's divided difference interpolation formula. **6**

b) The following table gives square roots for integers. Determine the square root of 2.5 using linear interpolation formula. **6**

x	1	2	3	4	5
f(x)	1	1.4142	1.7321	2	2.2361

7. a) Explain the inverse interpolation technique. **4**

b) Explain the Chebyshev interpolation polynomial. **4**

c) Compute the value of x for y = 0.6742 from the table given below. **4**

x	3.5	4.0	4.8	5.6
y	0.5441	0.6020	0.6892	0.7482

OR

8. a) Explain the spline interpolation technique. **4**

b) What are the different assumptions of inverse interpolation. **4**