

B.C.A. (Part—I) Semester—II Examination
NUMERICAL METHODS
Paper—2ST4

Time : Three Hours]

[Maximum Marks : 60

Note :— (1) **ALL** questions are compulsory.

(2) All questions carry equal marks.

1. (a) Explain the principle of least square. 4
(b) Derive the normal equation for fitting a polynomial of degree k . 4
(c) Fit a straight line to the given data :

X	:	1	2	3	4	5	6	
Y	:	1200	900	600	200	110	50	4

OR

2. (a) Explain lines of regression. 4
(b) Fit a second degree parabola to the following data :

X	:	1	2	3	4	5	6	7	8	9	
Y	:	2	6	7	8	10	11	11	10	9	4

- (c) Explain why there are two lines of regression. 4
3. (a) Explain algebraic equation and transcendental equation. 4
(b) Explain iterative methods for a system of non-linear equations. 4
(c) Fit the curve $Y = ae^{bx}$ to the following data :

X	:	1	2	3	4	5	6	7	8	
Y	:	15.3	20.5	27.4	36.6	49.1	65.6	87.8	117.6	4

OR

4. (a) Explain solution to algebraic and transcendental equation. 4
(b) Explain graphical method of finding roots of equation. 4
(c) Fit a power model $y = ae^{bx}$ to the following data :

x	:	1	2	3	4	5	6	
y	:	151	100	61	50	20	8	4

5. (a) Explain interpolation with its assumption. 4
(b) Using Lagrange's interpolation formula compute $f(5)$ from the given data :

x	:	1	2	3	4	7
f(x)	:	2	4	8	16	128

 4
(c) Explain the method of writing divided difference. 4

OR

6. (a) Explain interpolation with unequal intervals. 4
(b) Derive Lagrange's interpolation formula. 4
(c) Using Lagrange's interpolation find the value of y for $x = 3$ for the data given below :

x	:	0	1	2	5
y	:	2	3	12	147

 4
7. (a) Explain what do you mean by inverse interpolation. 4
(b) Using Lagrange's interpolation formula compute the value of x for $y = 0.6742$ from the following table :

x	:	3.5	4.0	4.8	5.6
y	:	0.5441	0.6020	0.6812	0.7482

 4
(c) Explain the concept of spline interpolation. 4

OR

8. (a) Explain the procedure to solve cubic spline. 4
(b) Using Lagrange's inverse interpolation, compute x when $y = 85$ from the given data :

x	:	2	5	8	14
y	:	94.8	87.9	81.3	68.7

 4
(c) Explain the concept of Chebyshev's interpolation polynomial. 4
9. (a) Explain Trapezoidal rule for numerical integration. 4
(b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Simpson's 1/3rd rule. 4
(c) Explain general quadrature formula of numerical integration. 4

OR

10. (a) Obtain Simpson 3/8th rule by using general quadrature formula. 4
(b) Evaluate $\int_0^4 e^x dx$ by Simpson's 1/3rd rule. 4
(c) Obtain Trapezoidal rule for numerical integration. 4