

- (e) Apply the quotient – difference method to obtain the approximate roots of the equation.
 $X^3 - 7x^2 + 10x - 2 = 0$.
- (f) Define rate of convergence. Obtain rate of convergence of Newton Raphson method.

2 Attempt any **four** of the following : **4×3=12**

- (a) From the following table, find the number of students who obtained less than 45 marks by method of interpolation :

Marks :	0-30	31-40	41-50	51-60	61-70	71-80	81-100
No. of Students :	0	31	42	51	35	31	5

- (b) The ordinates of the normal curve are given by the following table

x :	.0	.2	.4	.6	.8
y :	.3989	.3910	.3683	.3332	.2897

Calculate : (i) $y(.25)$ (ii) $y(.62)$.

Use Newton's method of interpolation.

- (c) Use stirling formula to find $y(28)$ given

x :	20	25	30	35	40
y :	49225	48316	47236	45926	44306

- (d) Applying Lagrange's formula, find the interpolating polynomial $f(x)$ for the following set of observations.

x :	0	1	4	5
y :	4	3	24	39

Also find $f(2)$.

- (e) By means of Newton's divided difference formula, find the values of $f(2)$, $f(8)$ and $f(15)$ from the following table.

$x :$	4	5	7	10	11	13
$f(u) :$	48	100	294	900	1210	2028

- (f) Differentiate between interpolation and curve fitting.

3 Attempt any **two** parts : **7×2=14**

- (a) Fit a natural cubic spline to the following data:

$x:$	2	3	4
$y:$	11	49	121

Hence compute

- (i) $y(2.5)$ and
(ii) $y'(2)$
- (b) Find the first and second derivative at 1.1 for the data

$x :$	1.00	1.2	1.4	1.6	1.8	2.00
$f(u) :$	0	.1280	.5440	1.2960	2.432	4.00

- (c) Evaluate the integral

$$\int_0^1 \frac{x^2}{1+x^3} dx$$

Simpson's rule taking four equal intervals, and hence find the value of $\log_e 2$.

4 Attempt any **two** parts : **6×2=12**

(a) For a bi variate distribution $n = 18$,

$$\sum x^2 = 60, \sum y^2 = 96, \sum x = 12, \sum y = 18, \sum xy = 48$$

Find the equations of lines of regressions.

(b) Fit the curve $y=ax^b$ to the following data, using method of least squares.

$x :$	1	2	3	4	5	6
$y :$	2.98	4.26	5.21	6.1	6.8	7.5

(c) Write short notes on : **6×2=12**

- (i) Quality Control Methods
 - (ii) Multiple Regression Analysis.
-