

7. _____ formula is used to find the unknown values of 'y' for some x which lies at the end of the tabular values

- (a) Newton's Forward (b) Lagrange's
(c) Newton's divided difference (d) Newton's Backward

8. For what type of data the divide and different table is used

- (a) Equal interval (b) Unequal interval
(c) Marginal interval (d) All type of interval

9. Two point Gaussian Quadrature formula is $\int_{-1}^1 f(x)dx =$

- (a) $f\left(-\frac{1}{\sqrt{3}}\right) + f\left(\frac{1}{\sqrt{3}}\right)$ (b) $f(-\sqrt{3}) + f(\sqrt{3})$
(c) $f(-1) + f(1)$ (d) None of these

10. Error in Simpson's rule is of order

- (a) h (b) h^2 (c) h^3 (d) h^4

PART - B (5 x 2 = 10 Marks)

11. Define Type-I error and Type-II error.

12. Write the differences between RBD and LSD.

13. Solve the following system of equations, using Gauss - Jordan elimination method

$$2x + y = 3, x - 2y = -1.$$

14. State Lagrange's interpolation formula.

15. Write the Gaussian three points Quadrature formula.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) A sample of 26 bulbs gives a mean life of 990 hours with a standard deviation of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours.

Is the sample not up to the standard? (8)

(ii) A sample of size 13 gave an estimated population variance of 3.0, while another sample of size 15 gave an estimate of 2.5, could both samples from populations with the same variance? (8)

Or

- (b) A real estate agency wants to compare the appraised values of single-family homes in two cities in Michigan. A sample of 60 listings in Lansing and 99 listings in Grand Rapids yields the following results (in thousands of dollars):

	Lansing	Big Rapids
\bar{X}	191.33	172.34
S	32.60	16.92
n	60	99

Is there evidence of a significant difference in the average appraised values for single-family homes in the two Michigan cities? Use 0.05 level of significance. (16)

17. (a) Five doctors, each test five treatments for a certain disease and observe the number of days each patient takes to recover. The results are as follows:
Given Recovery time in days.

Doctors	Treatments				
	1	2	3	4	5
A	10	14	23	19	20
B	11	15	24	17	21
C	9	12	20	16	19
D	8	13	17	17	20
E	12	15	19	15	22

Discuss the significant difference between (i) doctors (ii) treatments. (16)

Or

- (b) Compare and contrast the Latin square design with the Randomised Block Design. (16)

18. (a) (i) Solve the following equations by Gauss Seidel method $4x + 2y + z = 14$;
 $x + 5y - z = 10$ and $x + y + 8z = 20$. (8)

- (ii) Using Gauss Jordan methods find the inverse of $A = \begin{pmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{pmatrix}$. (8)

Or

(b) (i) Using Newton - Raphson method, solve $x \log_{10} x = 12.34$ taking the initial value x_0 as 10. (8)

(ii) Solve by Gauss - elimination method the following system
 $3x + 4y + 5z = 18; 2x - y + 8z = 13; 5x - 2y + 7z = 20.$ (8)

19. (a) Using Lagrange's method, find the value of $f(3)$ from the following table: (16)

x	0	1	2	4	5	6
y	1	14	15	5	6	19

Or

(b) (i) From the following table find $f(x)$ and hence $f(6)$ using Newton's Divided difference formula. (8)

x	1	2	7	8
$f(x)$	1	5	5	4

(ii) The population of a town is as follows:

Year x	1941	1951	1961	1971	1981	1991
Population in Lakhs	20	24	29	36	46	51

Estimate the population increase during the period 1946 to 1976. (8)

20. (a) The table given below gives the velocity V of a moving particle at time t seconds. Find the distance covered by the particle in 12 seconds and also the acceleration at $t = 2$ seconds using Simpson's rule. (16)

X	:	0	2	4	6	8	10	12
V	:	4	6	16	34	60	94	136

Or

(b) (i) By dividing the range into 10 equal parts, evaluate $\int_0^{\pi} \sin x \, dx$ by Trapezoidal rule. (8)

(ii) Evaluate $\int_{-1}^1 \frac{x^2}{1+x^4} dx$ by using three points Gauss quadrature formula. (8)