

22. Calculate first four moments about the mean from the following data:

Mark:	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students:	8	12	20	30	15	10	5

23. An urn X contains 3 white and 5 black balls. Another urn Y contains 6 white and 4 black balls. A ball is transferred from the Urn X to urn Y, then a ball is taken from urn Y. Find the probability that it will be white.
24. The following data represents the number of units of commodity produced by 3 different workers using 3 different types of machines.

Workers	Machines		
	A	B	C
X	16	64	40
Y	56	72	56
Z	12	56	28

Test (a) whether the mean productivity is the same for the different machine types, and (b) whether the three workers differ with respect to mean productivity.

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Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

- List the rules to round-off a number.
- What is Gauss elimination method?
- State trapezoidal rule to evaluate  $\int_a^b f(x)dx$ .
- Write Runge-Kutta second order formula to solve  $\frac{dy}{dx} = f(x, y)$ ,  $y(x_0) = y_0$ .
- Find the geometric mean of 2, 8, 18, and 72.
- Define Range and standard deviation.
- Define Conditional probability.
- Find the mathematical expectation of tails appearing in tossing two coins.

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9. Write the normal equations to fit a curve of the form  $y = ax^2 + bx + c$ .
10. State any two properties of multiple correlation.
11. Write recursive formula to find a solution of  $f(x) = 0$  using secant method.
12. Write the mean and variance of Poisson distribution.

PART B — ( $5 \times 5 = 25$  marks)

Answer any FIVE questions.

13. Find the root of the equation  $y(x) = x^3 - 2x - 5 = 0$ , which lies between 2 and 3 using Muller method.

14. Evaluate  $\int_4^{5.2} f(x) dx$  by (a) Trapezoidal method and

(b) Simpson's  $1/3^{\text{rd}}$  rule for the following data:

$x$ :	4	4.2	4.4	4.6	4.8	5.0	5.2
$f(x)$ :	1.3862	1.4351	1.4816	1.5261	1.5686	1.6094	1.6486

15. Find the mean deviation about median for the following data:

Class:	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency:	5	8	12	15	20	14	12	6

16. A problem in Statistics is given to five students A, B, C, D and E. Their chances of solving it are  $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$  and  $\frac{1}{6}$ . What is the probability that the problem will be solved?

17. From the following data obtain the regression equation of  $y$  on  $x$ .

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

18. Find a positive root of the equation  $xe^x = 2$  which lies between 0 and 1 by Regula-Falsi method.
19. In a trivariate distribution  $\sigma_1 = 2$ ,  $\sigma_2 = \sigma_3 = 3$ ,  $r_{12} = 0.7$ ,  $r_{23} = r_{31} = 0.5$ . Find  $b_{12.3}$ .

PART C — ( $3 \times 10 = 30$  marks)

Answer any THREE questions.

20. Use Gauss-Jordan method to solve the following system of equations:

$$10x + y + z = 12, \quad 2x + 10y + z = 13, \quad x + y + 5z = 7$$

21. Use Taylor's series compute  $y(0.2)$ ,  $y(0.4)$  given

$$\frac{dy}{dx} = 1 - 2xy, \quad y(0) = 0.$$