



Instructions: **DO NOT write or mark anything on the question paper**

- I) All working steps should be shown clearly
- II) Scientific calculators may be used
- III) Statistical tables and graph sheets will be supplied on request.

PART - A

I. Answer any TEN of the following questions.

10 x 1 = 10

1. Define Net Reproduction Rate.
2. Why do we use price index number ?
3. Name the index number which does not satisfy unit test.
4. Which method is an effective method in obtaining trend if trend is linear ?
5. What is the standard deviation of the number of recoveries among 8 patients when the probability of recovery is 0.75 ?
6. Write the recurrence relation between two successive probability of Binomial Distribution.
7. Define confidence interval.
8. Define critical region.
9. Write the formula of χ^2 test.
10. What are the stages of manufacturing process?
11. Define degenerate?
12. What are the methods to solve a rectangular game?

PART -B

II. Answer any TEN of the following questions.

10 x 2 = 20

13. Explain briefly registration methods of obtaining vital statistics.
14. Why do we use index number?
15. State two characteristics of index number
16. Write two demerits of moving average methods.
17. Write down the Newton's formula for Interpolation.
18. Write mean and variance formula of hyper geometric distribution.
19. If 1.5 percent of items produced by a manufacturing unit are known to be defective, what is the probability that a sample of 200 items would contain no defective item ?
20. If variance is 9 cm^2 and sample size is 36 then calculate standard error of sample.
21. Define estimation and power of a test.
22. Under what conditions a lot is accepted and rejected in double sampling plan?
23. From the following data, find the value of the game and pay-off position using maximin - minimax Principle.

Player B

		B1	B2	B3
Player A	A1	3	1	2
	A2	1	0	3
	A3	4	2	3

24. The L.L.P. is given as

$$\text{Max. } Z = 6X + 7Y$$

subject to $6X + Y \geq 21$
 $2X + 6Y \geq 12$ and $x, y \geq 0$

Identify the points to represent graphically from the constraints.

Section – C

III. Answer any EIGHT of the following questions.

8 x 5 =40

25. Calculate Gross Reproduction Rate for the following data.

Age Group	15-19	20 -24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49
Female Population	1600	1700	1700	1800	1700	1600	1500
Female Births	19	21	90	62	33	12	02

26. Show that Fisher index number satisfies T.R.T and F.R.T.

27. Compute Marshall-Edgeworth's, Dorbish-Bowley's and Fisher quantity index number for the current year on the basis of the following data.

Commodity	Base Year		Current Year	
	Quantity	Value	Quantity	Value
A	50	350	60	420
B	120	600	140	700
C	30	330	20	200
D	20	360	15	300
E	05	40	05	50

28. Fit a straight line trend of the form $y = a + bx$ for the following data.

Year	2002	2004	2006	2008	2010	2012
Value	6	7	6	9	11	9

29. Below are given wages earned by workers in a factory. Calculate the number of workers earnings more than Rs. 650 per week.

Weekly wages	Up to 500	Up to 600	Up to 700	Up to 800	Up to 800	Up to 900
No. of workers	50	150	300	500	700	800

30. A renowned hospital usually admits 200 patients every day. One out of 100 requires special room facilities. One particular morning it was found that only one special room is available. What is the probability that more than 3 patients would require special room facilities ?

31. Weights in Kilograms of 10 students are given as 38 , 40 , 45, 53 , 47, 43 , 55 , 48 , 52 , 49 . Can we say that variance of the distribution of weights is equal to 20 kg² .

32. Two different types of drugs A and B were tested on patients for increasing weight. 5 persons were given drug A and 7 persons were given drug B . The increase in weight in pounds is given below.

Drug A	8	12	13	9	3		
Drug B	10	8	12	15	6	8	11

Do the two drugs differ significantly with regard to their effect in increasing weights ?

33. In a throw of a die the following distribution of faces were obtained.

Faces	1	2	3	4	5	6
Frequency	30	25	18	10	22	15

Test at 5% level of significance that the die is unbiased.

34. What are the advantages and disadvantages of acceptance sampling.

35. The purchase price of machine B is Rs. 800. Its salvage rates and maintenance costs are below:

Age	1	2	3	4	5
Salvage (Rs.)	4500	3500	2500	1500	500
Maintenance (Rs.)	500	600	800	1100	1500

36. Graphically solve the following L.P.P.

$$\text{Max. } Z = 40000X + 50000 Y$$

subject to $1000 X + 1500 Y \leq 20000$

$$X \leq 1$$

$$Y \geq 5 \quad \text{and } X, Y \geq 0$$

SECTION - D

IV. Answer any TWO of the following questions.

2 x 10 = 20

37. For the following data compute the Gross Reproduction Rate per woman and Net Reproduction Rate and hence comment on the result.

Age Group (in years)	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49
Female Population	16000	14500	13000	11500	10000	8700	7500
Female Births	480	812	650	460	300	87	30
Survival ratio	0.91	0.90	0.89	0.88	0.87	0.86	0.85

38. Show that Fisher index number is an ideal index number, considering the following data.

Items	2004		2006	
	Price(Rs.)	Quantity	Price(Rs.)	Quantity
A	8	15	9	15
B	7	12	8	13
C	10	10	10	10
D	12	14	15	16

39. For the following data estimate the sales figure for the year 2012 using an equation of the form $y = ab^x$

Year	2005	2006	2007	2008	2009	2010	2011
Sales	32	47	65	92	132	190	275

40. Fit a poisson distribution to the following data and test for goodness of fit.

No. of mistakes	0	1	2	3	4	5 and more
No. of pages	31	34	21	12	2	0

SECTION - E**V. Answer any TWO of the following questions.****2 X 5 = 10**

41. The weights of 1000 students are normally distributed with mean 55K kg. and standard deviation 3kgs. Find the number of students with weights.
i) less than 58 kg. ii) between 57 kg. and 60 kg.
42. In a college out of 500 students who took SSLC examination. 460 passed examination out of 400 students who took PUC examination and 350 passed. At 1% level of significance can it be concluded that SSLC students have performed better than PUC.
43. In a college preliminary and final tests are conducted. The number of students who passed the final test are 740 and those who failed are 260. There are 605 students who have passed preliminary as well as and 65 students who have failed in both. Test whether there is any association between the results of the preliminary and final test.
44. A firm has to supply 80 electric motors every week to a customer. The setup cost is Rs.280 . The inventory maintenance cost is Rs.15 per unit per year and if inability to supply motors in time costs Rs.100 per unit per year. Suggest an inventory policy which is most economical.
