JGi JAIN COLLEGE V V Puram

2nd PUC MOCK Paper – Jan. 2024

Course:	2nd year PUC
Subject:	Statistics
Max. Marks:	80
Duration:	3:15 hour

Instructions:

        (1) Graph sheets and statistical tables will be supplied on request.

        (2) Scientific calculator may be used.

        (3) All working steps should be shown clearly.

        (4) Section – A should be written in the beginning of the answer booklet.

SECTION - A

I. Choose the correct answer.   **(5x1 = 5)**

1. The capacity of women to bear children is called-

   a) Fertility   b) Mortality   c) Growth   d) Fecundity

2. Laspeyre's index number is expected to have

   a) Upward bias   b) Downward bias   c) No bias   d) None of these

3. The variance of Bernoulli distribution is-

   a) p b) np c) pq d) npq

4. The value of degrees of freedom in a 2 x 2 contingency table is

   a) $n-1$ b) 1   c) n d) $n-c$

5. Graphical solution to the linear programming problem lies in the

   a) I quadrant   b) II quadrant   c) III quadrant   d) IV quadrant

II. Fill in the blanks by choosing the appropriate word from those given in the brackets.   **(5 x1 =5)**

   (c , $\sum a_i = \sum b_j$, 1 , estimator , 100 , estimate)

6. The value of the index number for the base year is_____

7. In a Binomial distribution, if n=5 and q = 0.8, the mean is_____

8. Any statistic which is used to estimate an unknown parameter is called an _____

9. In statistical quality control _____is used for number of defects.

10. A transportation problem is balanced if and only if _____

III. Match the following   **(5 x1 = 5)**

11. N.R.R per woman=1   Size of the test

12. $P_{01} \times P_{10} = 1$ Mean = Variance

13. Poisson Distribution   Variance= S.D

14. P (Reject H$_o$, when it is true)   Population remains constant

15. Minimax   Time reversal test

                                     Minimum of column maximum

IV. Answer the following questions. (5 x 1 = 5)

16. What is life table?
17. Which component of a time series is associated with 'increase in money circulation for last 10 years'?
18. For a chi-square variate with 10. d.f., find mode.
19. A random sample of size 36 is drawn from a population whose standard deviation is 4. Compute standard error of the sample mean.
20. Write an advantage of inventory.

SECTION - B

V. Answer any FIVE of the following questions. (5 x 2= 10)

21. Diagrammatically represent 'business cycle' with stages.
22. Write down the condition for applications of Binomial expansion method of interpolation and extrapolation.
23. Mention any two features of Binomial distribution.
24. If n = 4 for student's t distribution, find S.D.
25. What are one tailed and two tailed tests?
26. Given $\bar{x}$ = 203gm, μ = 200gm, σ = 10gm, calculate test statistics Z.
27. What do you mean by process control and product control?
28. The following is the pay-off matrix of player A , write down the pay-off matrix of player B.

$$\begin{array}{c} & & \text{Player B} \\ & & B_1 \quad B_2 \quad B_3 \\ \text{Player A} & \begin{array}{c} A_1 \\ A_2 \end{array} & \begin{pmatrix} -8 & 5 & 0 \\ 3 & -2 & 8 \end{pmatrix} \end{array}$$

SECTION - C

VI. Answer any FOUR of the following questions. (4 x 5 = 20)

29. Find weighted G.M. price index number from the following data.

Item		A	B	C	D	E
Weight in %		30	15	20	10	25
Price	2019	100	20	70	20	40
(Rs.)	2023	90	20	60	15	55

30. Below are given the wages earned by workers per day in a certain factory. Using Newton's advancing difference method, estimate the number of workers earning up to Rs.650 per day.

Wages per day up to (Rs.)	500	600	700	800	900
No. of workers	20	120	240	430	740

31. It has been found that on an average 4 patients visit a particular doctor during one hour. What is the probability that during a particular hour i) doctor is free ii) more than 4 patients visit the doctor?

32. A basket has 15 mangoes, out of which 9 are ripe. 4 mangoes are randomly selected.
    i) What is the probability that all the picked mangoes are ripe?
    ii) Find the expected number of ripe mangoes among the picked ones.

33. From the following data test whether mean score of college-A is equal to college-B.

College	No. of students	Mean marks	S.D.
A	450	53	25
B	350	50	15

34. Ten samples of 100 P.V.C. pipes manufactured by a firm are inspected for the number of defectives. The number of defective pipes is noted as: 2, 2, 3, 1, 0, 1, 5, 4, 5, 6. Obtain suitable control limits.

35. Solve the following L.P.P graphically:

$$\text{Max. } Z = 10x + 15y$$
$$\text{s.t. } x + y \geq 10$$
$$3x + 2y \leq 60$$
$$\text{And } x, y \geq 0$$

   (For visually challenged students only)
   Explain graphical method of solving L.P.P.

36. Find an initial basic feasible solution by Matrix Minima Method. Compute the total transportation cost. Is the solution to T.P non degenerate?

		To			Supply
		D1	D2	D3	
From	O1	8	4	12	500
	O2	10	5	6	200
	O3	7	5	3	100
	Demand	400	200	200	

VII. Answer any TWO of the following questions. $\quad$ **(2 x 5 = 10)**

37. The mean I.Q. of a large number of children of age fourteen is 95 and the variance is 25. Assuming that I.Q. follows normal distribution, find the
   i. percentage of the children with I.Q. under 85.
   ii. proportion of the children with I.Q. between 80 to 90

38. A manufacturer claims that less than 2% of his products are defective. A retailer buys a batch of 1000 articles from the manufacturer and finds that 10 are defective. Test at 1% level of significance that, whether the manufacturer's claim is justificable.

39. The following data represents the blood pressure of 5 persons before and after performing dhyana:

Persons	1	2	3	4	5
Blood Pressure before Dhyana	90	90	100	88	99
Blood Pressure after Dhyana	88	90	95	90	96

   Can we conclude at 5% level of significance that Dhyana reduces blood pressure?

40. Of the 500 workers in a factory exposed to an epidemic, 350 were attacked, 200 had been inoculated and of these 100 were attacked. Test whether Inoculation and attack of epidemic are independent.

SECTION - D

VIII. Answer any TWO of the following questions.   **(2 x 10 = 20)**

41. (a) Find the gross reproduction rate from the following data. Obtain the average number of female children born to women of child bearing age.

Age group (in year)	Female population	Female births
15 – 19	10000	200
19 – 24	9000	540
25 – 29	8000	400
30 – 34	7000	280
35 – 39	6000	180
40 – 44	5000	100
45 – 49	4000	40

(b) From the following data, compute standardized death rates for village A and village B. Which village is healthier?

Age group (in years)	Village-A		Village-B		Standard Population
	Population	Deaths/1000	Population	Deaths/1000	
0-20	4000	18	3000	20	2000
20-40	12000	10	20000	9	3000
40-60	6000	15	4000	8	6000
60& above	8000	20	3000	24	4000

42. For the following data compute ideal index number and show that it satisfies time reversal test and factor reversal test.

Items	Quantity		Price	
	Base year	Current year	Base year	Current year
A	45	22	44	56
B	40	38	46	58
C	56	32	18	10
D	8	5	4	9

43. By the method of least squares, fit a parabolic trend for the following time series. Estimate the profit for the year 2024.

Year	2012	2014	2016	2018	2020	2022
Profit (in lakhs)	10	12	16	24	38	45

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