JAIN COLLEGE V V Puram II PUC MOCK PAPER – 1: January. 2025	Course: II PUC Subject: Statistics Max.Marks: 80 Duration: 3hr

Instructions:

i) **Statistical table and graph sheets will be supplied on request.**
ii) **Scientific calculators are allowed.**
iii) **All working steps should be clearly shown.**
iv) **For Section-A only the first written answers will be considered for evaluation.**
v) **For question having diagram, graph and map, alternative questions are given at the end of the question paper in a separate section for visually challenged students.**

SECTION - A

I. Choose the appropriate answer from the choices given below: (5 x 1 = 5)

1. In a life table, if l_1= 95400 and d_1 = 1908, the survival rate is
   a) 0.01 b) 0.02 c) 0.05 d) 0.98
2. If Laspeyre's price index number is 142 and Paasche's price index number is 144, the Dorbish-Bowley's price index number is
   a) 141 b) 142 c) 143 d) 144
3. For what value of Binomial distribution is negatively skewed.
   a) p< 0.5 or q > 0.5 b) p> 0.5 or q < 0.5
   c) p< 0.5 or q < 0.5 d) p> 0.5 or q > 0.5
4. The probability of rejecting the null hypothesis, when it is not true is called
   a) Size of the test b) Type – I error
   c) Power of a test d) Type – II error
5. A general form of L.P.P. contains -
   a) The objective function b) The set of constraints
   c) non-negativity constraints d) all the above

II. Fill in the blanks by choosing the appropriate answer given in the brackets: (5 x 1 = 5)
[1.2, time horizon, defective, confidence limits, quality, positively]

6. While constructing index numbers, the _____ of product is not taken into consideration.
7. Poisson distribution is _____ skewed.
8. The boundary values of confidence intervals are _____
9. An item having one or more defects is a _____ item.
10. The time period over which the inventory control is planned is_____

III. Match the following: **(5 x 1 = 5)**

11.

I. Fertility	a) $P_{01} = 80$
II. 20% of the price of the commodity decreases	b) Dependent samples
III. Range of chi-square distribution	c) Inventory
IV. Paired t-test	d) Independent samples
V. Physical stock of goods	e) (0 to ∞)
	f) Births occurring to women of child bearing age

IV. Answer the following question: **(5 x 1 = 5)**

12. Define Vital statistics.
13. Give an example for irregular variation.
14. In which distribution variance and standard deviation are equal.
15. Define alternative hypothesis.
16. In a rectangular game, if saddle point exists and minimax is -4, what is the value of maximin?

SECTION – B

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

17. Write down the normal equation for fitting linear trend.
18. Write down the condition for applying binomial expansion method of interpolation and extrapolation.
19. If $Q_1 = 30$ and $Q_3 = 70$, Find the mode of the normal distribution.
20. Mention two features of a student's t-distribution.
21. What do you mean by estimator and estimate?
22. Sizes of two samples are 50 and 100. Population standard deviations are 20 and 10. Compute SE$\left(\bar{x}_1 - \bar{x}_2\right)$.
23. Name the control chart for variables.
24. The cumulative maintenance cost of a machine during 3rd year is Rs. 10,000. Its purchase cost is Rs.30,000. Find the annual average cost assuming that the machine has no resale value.

SECTION-C

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

25. Calculate Suitable index number from the following data and conclude.

Items	Price (Rs.)		Quantity 2019
	2018	2019	
A	130	170	65
B	50	60	20
C	90	110	20
D	40	70	10
E	50	90	15

26. For the following data interpolate the value of Y when X = 12.

X	10	20	30	40	50
Y	23	30	34	37	39

27. 40% of the buttons manufactured by a firm are found to be defective. In a random sample of six buttons, find the probabilityof getting (i) Exactly 4 defective buttons
(ii) At least two defective buttons.

28. There are 20 fruits in baskets, out of which 8 are mangoes and rests are oranges. A girl picks 5 fruits at random from the basket. Find the probability that she gets 3 mangoes. Also find S.D.

29. A sample of 100 students is taken from a college. If the mean and variance of their weights are 51kg and $25kg^2$ respectively, Test at 5% L.O.S that the average weights of college students are 50kg?

30. Obtain the value of the game by principles of Dominance and mention the best strategies of the players.

		Player – B			
		B_1	B_2	B_3	B_4
Player – A	A_1	1	2	0	-3
	A_2	4	6	3	5
	A_3	-3	-1	-2	0
	A_4	2	7	0	1

31. The demand for an item is 7,000 units per year. The cost of placing an order is Rs.300. The holding cost is Rs.10 per unit peryear. The shortage cost is Rs.3 per unit per year. Find
    (i) Economic order quantity.
    (ii) Minimum annual average inventory cost.

VII. Answer any TWO of the following questions: (5 x 2 = 10)

32. The daily wages of 1000 workers of a factory are normally distributed with mean Rs.700 and S.D of Rs.40. Calculate the percentage of workers whose daily wages will be i) less than Rs.800 ii) between Rs.690 and Rs.720.

33. Eleven school boys were given a test in geometry. They were given a month's tuition and second test was held at the end of it. Test whether the tuition was benefited the students.(Use $\alpha = 0.01$)

Boys	1	2	3	4	5	6	7	8	9	10	11
Marks (I test)	23	20	19	21	18	20	18	17	23	16	19
Marks(II test)	24	29	22	18	20	22	20	20	23	20	17

34. Following table gives mean ($\bar{x}$) and range (R) of 6 samples of size 4 each.

Sub-group	1	2	3	4	5	6
Mean($\bar{x}$)	10	11.4	9	3	17.2	18.6
Range(R)	8	7	4	9	8	6

Find the control limits for $\bar{X}$ - chart.

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

Minimize $Z = 5X + 4Y$

s.t. $4X + Y \geq 40$

$2X + 3Y \geq 60$

and $X, Y \geq 0$

SECTION – D

VIII. Answer any two of the following questions: (10 x 2 = 20)

36. Compute standardized death rates for Town A and Town B taking Town A Population as standard and Comment.

Age (in years)	Town A		Town B	
	Population	Deaths	Population	Deaths
Below 10	16000	176	5000	130
10-30	50000	250	27000	162
30-70	120000	840	62000	527
70 and above	14000	910	10000	420

37. a) The group indices and the corresponding weights for the working class in an industrial town for the years 2023 and 2024 with the base 2022 are given below. Compute CPI for the years 2023 & 2024 and comment.

Group	Group weight	Group Index with base 2022	
		2023	2024
Food	71	370	380
Clothing	3	420	500
Fuel	9	470	340
House rent	7	110	120
Misc.	10	280	282

b) For the following data, Show that Fisher's price index number satisfies factor reversal test.

Item	Base year		Current year	
	Price (Rs)	Value	Price (Rs)	Value
A	5	50	8	56
B	4	32	5	40
C	1	10	2	24
D	2	18	4	40

38. a) Find four yearly moving averages from the following data and comment.

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023
Production(000's)	12	16	08	20	24	36	32	40	42

b) Fit a linear trend of the form y = a+bx for the following time series.

Year	2014	2016	2018	2020	2022
Student strength ('000s)	12	11	08	09	13

SECTION – E

(For visually challenged students only)

39. Write the procedure of solving linear programming problem graphically.

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