Jain College, Jayanagar
II PUC Mock Paper – II
Sub: STATISTICS

Duration: 3 Hrs 15 mins **Max.Marks: 100**

Note: 1. Statistical tables and graph sheets will be supplied.
2. Scientific calculators are allowed.
3. All working steps should be clearly shown.

PART – A

I. Answer any ten questions: 1×10 =10

1. Mention a source of vital statistics.
2. Mention one use of cost living index number.
3. State the condition for an Index number to satisfy TRT.
4. What is a historigram?
5. Give an example for seasonal variation.
6. If X is a Poisson variate with mean 3, what is its standard deviation?
7. Define standard error.
8. Define level of significance.
9. Which is the best estimator of the population mean?
10. Define process control.
11. Define is meant by pay-off in a rectangular game?
12. Define setup cost.

PART – B

II. Answer any 10 questions: 2×10 =20

13. In a population of 11,200, there were 212 deaths in an year. Find CDR.
14. State any two uses of Index number.
15. Mention the components of a time series.
16. In a Poisson distribution the first probability term is 0.2725, find the next probability term.
17. Mention any two features of a hyper geometric distribution.
18. The proportion of vegetarians of a city 0.48. Find the standard error of the proportion of vegetariance in a random sample of size 20.
19. If the parameter of t-distribution is 6, find the variance.
20. State any two characteristics of a game.
21. Distinguish between defect and defective.
22. When do you say that an LPP has a) Unique solution b) No solution?
23. Define inventory and write any one use.
24. Mention two disadvantages of maintaining an inventory.

PART – C

III. Answer any 8 questions: 5×8 = 40

25. From the following data, calculate the Crude birth rate and General fertility rate.

Age Group	Male Population	Female Population	Live births
0-14	46,000	43,000	-
15-24	34,000	35,000	6846
25-39	39,000	38,000	3893
40-49	30,000	28,000	674
50-79	27,000	26,000	-
80 & above	3,000	4,000	-

26. Compute the cost of living index number by aggregative expenditure method.

Commodity	Base year		Current year price
	Price (in Rs)	Expenditure	
Rice	200	1000	900
Sugar	300	300	1500
Soap	15	45	30
Kerosene	140	140	420
Rent	50	600	300
Others	50	600	400

27. Compute the trend values by finding four-yearly moving averages for the following time series.

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Value	103	104	107	101	102	104	105	99	100

28. Draw histoigram and trend line by the method of semi-averages.

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sales	412	438	444	454	470	480	490	500	530

29. Team A has probability 2/3 of winning a game. If it plays 4 games, find the probability that it wins
i) 2 games ii) atleast one game

30. From the following data, obtain the value of y when x = 9 by using Newton's forward difference method.

X	3	7	11	15	19
Y	42	43	47	53	60

31. From the following data regarding heights of randomly selected Punjabis and Biharis, test whether on an average Punjabis are taller than Bihari.

	Punjabis	Biharis
Sample size	100	120
Mean height(cms)	174.4	173.7
S.D (cms)	3	3

32. On eight random days, the time taken by a city bus to reach the college are noted as below. Test the hypothesis that the mean time for the bus to reach the college is 30 minutes.

Day	1	2	3	4	5	6	7	8
Time (minutes)	27	34	30	35	31	30	29	32

33. From the following data regarding eye-colour of fathers and their sons, test whether father's eye-colour and son's eye-colour are independent. (use $\alpha = 1\%$)

Son's eye colour

Father's eye colour		Light	Dark
	Light	100	75
	Dark	70	125

34. Following table give Mean $(\overline{X})$ and Range (R) of 6 samples of size 5 each:

Sub-group number	1	2	3	4	5	6
Mean $(\overline{X})$	10	11	10	12	15	18
Range (R)	5	7	4	9	6	5

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

35. Obtain an initial basic feasible solution to the following T.P by North west corner rule method. Also obtain the transportation cost.

Warehouse

Factory	D_1	D_2	D_3	D_4	Supply
A	19	30	50	10	7
B	70	30	40	60	9
C	40	8	70	20	18
Requirement	7	8	5	14	34

36. Solve the following game by maximin-minimax principle

Player B

$$\text{Player A}\begin{matrix} A_1 \\ A_2 \\ A_3 \end{matrix}\begin{bmatrix} B_1 & B_2 & B_3 \\ 1 & 3 & 1 \\ 0 & -4 & 3 \\ 1 & 5 & -1 \end{bmatrix}$$

PART – D

IV. Answer any 2 questions: 10×2 =20

37. From the following data, calculate the standardized death rates for locality A and locality B and comment

Age (years)	Locality A(standard population)		Locality B	
	Population	Deaths	Population	Deaths
Under 5	4500	135	4000	144
5-14	10000	40	10500	63
15-64	12500	75	13500	81
65&above	3000	140	2000	102

38. Compute Fisher's index number. Show that it satisfies both time reversal test and factor reversal test.

Item	2002		2004	
	Price	Quantity	Price	Quantity
P	5	6	6	7
Q	7	12	6	13
R	6	15	8	15
S	8	10	8	12

39. a) The weights of 1000 students are normally distributed with mean 40 kgs and standard deviation 4 kgs. Find the number of students with weight i) less than 50 kgs ii) between 40 & 45 kgs.

b) A random sample of size 60 from a population with unknown distribution has mean 103.4 and S.D 4. Test whether the population is 105.

40. The following data relates to the number of mistakes in each page of a book containing 180 pages.

No.of mistakes per page	0	1	2	3	4	5 or more	Total
No. of pages	130	32	15	2	1	0	180

Fit a Poisson distribution to the data and test for goodness of fit.

PART – E

V. Answer any 2 questions: 2 × 5 =10

41. There are 20 fruits in a basket, out of which 8 are mangoes and rests are oranges. A girl picks 5 fruits at random from teh basket. Find the probability that she gets 3 mangoes.

42. Nine students attended coaching classes for one month. The marks scored by these students in tests conducted before coaching and after coaching are as follows.

Test before coaching	43	76	37	67	84	13	53	35	54
Test after coaching	56	82	48	63	89	17	58	30	71

Based on these marks can we conclude that the coaching is effective in improving the marks?

43. The purchase price of a machine is Rs 7000. The operating costs and salvage rates are given below.

Year	1	2	3	4	5	6	7	8
Operating cost (Rs)	2000	2100	2300	2600	3000	3500	4100	4600
Salvage rate (Rs)	4000	3000	2200	1600	1400	700	700	700

Find out when the machine should be replaced?

44. The demand for an item is 700 units per year. The cost of placing an order is Rs 7 and holding cost is Rs 10 per year. The cost of shortage is Rs 3 per unit. Find i) EOQ ii) time between orders.

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