II PUC Mock I Paper Jan - 2020
Subject: Statistics (31)

Note: 1. Graph sheets and statistical tables will be supplied on request.
2. Scientific calculators are allowed.
3. All working steps should be clearly shown.

Section– A

I. Answer any TEN of the following: **10× 1 = 10**

1. What is longevity in lifetable?
2. What is 'value index number'?
3. State the relation between Laspere's, Paasche's and fisher's indices.
4. Give one example for upward trend in the time series.
5. For what value of 'P' binomial distribution is symmetrical?
6. For which distribution S.D and variance are equal?
7. Define statistical hypothesis.
8. Write down the χ^2 – test statistic for test of variance.
9. Define point estimation in testing of hypothesis.
10. Write a merit of acceptance sampling in S. Q.C.
11. What is T.P?
12. Define the term C_2 under inventory theory.

Section– B

II. Answer any TEN of the following: **10 × 2 = 20**

13. Give any two comparisons of CDR and STDR.
14. Calculate the consumer price index number using the following.

Items	A	B	C	D
Group Indices	102	97	108	110
Group weights	8	6	12	4

15. State circular test in index number.
16. Write any two merits of least square method.
17. Mention the conditions for applications of Binomial expansion method of interpolation.
18. If P = $\frac{1}{4}$ for a Bernuvlli distribution, write down mean and variance.
19. Write down the p.m.f of hypergeometric distribution with a = 12, b = 8, n = 5 with range.
20. Define acceptance region and rejection region under testing of hypothesis.
21. Given the following information. Find S.E $(\bar{x}, -\bar{x}_2)$

Samples	Sample Size	Sample mean	Sample variance
A	100	45	25
B	200	35	16

22. Write the upper and lower control limits for $\bar{x}$-chart when standards are not given.
23. Mention two characteristics of a competitive game.
24. Calculate E.O.Q when R = 5000/Month, C_1 = Rs 10/month and C_3 = Rs 200/month.

Section – C

III. Answer any EIGHT of the following: **8 × 5 = 40**

25. Calculate the crude death rate and standardized death rates for the following data.

Age (years)	Population (in 000's)	No of deaths	Standard population (in 000's)
Under 10	20	1050	19
10-19	50	600	20
20-39	30	240	28
40-59	10	500	17
60& above	10	1250	11

26. Explain the steps involved in the construction of consumer price index number.
27. Calculate P_{01} by simple average of price relatives using
    i) Arithmetic mean ii) Geometric mean from the following data.

Items	A	B	C	D	E
Price in 2012	26	32	18	12	40
Price in 2014	28	30	20	15	45

28. Obtain the trend values by 5 yearly moving average method for the following time series plot original and trend values on a graph.

Weeks	1	2	3	4	5	6	7	8	9
Production (in 000's tons)	15	16	18	18	20	19	22	24	25

29. Using Newton's forward interpolation method find y when x = 15.

X	12	14	16	18	20
Y	21	69	125	189	261

30. There are 100 wrist watchers in a box, 4 of them are defective. A random sample of 4 wrist watches are selected, what is the probability of getting less than 3 defective wrist watches? If there are 50 such boxes, in how many of them will you find exactly one defective wrist watches?

31. Mention five features of normal curve.

32. In a sample of 500 people in Kerala 280 are tea drinkers and the rest are coffee drinkers. Can assume that both coffee and tea are equally popular in Kerala at 1% level of significance?

33. From the following data test whether, there is any significant difference between mean marks of students in two subjects.

Subjects	Mean marks	Variance	Sample size
Statistics	84	10	12
Accountancy	80	8	10

34. For the following data find out the control limits for $\bar{X}$- Chart. (Given $A_2 = 0.577$).

Sub group no	1	2	3	4	5	6
Mean	50	48	49	52	50	48
Range	9	11	12	10	9	10

35. Solve the following L.P.P graphically.
Minimize $Z = 4x + 3y$
Subject to : $x + y \leq 2$
$x + 3y \geq 3$ and $x, y \geq 0$.

36. A machine costs Rs 35000 and the operating cost is estimated to be Rs 1500 for the first year and increase by Rs 3000 every year for next 5 years. Determine the optimum period for replacement of the machine, assuming that the machine has no resale value.

Section – D

IV. Answer any TWO of the following: **2× 10 = 20**

37. a) From the following data compute G.R.R and NRR.

Age (years)	Female Population	Female births	Survival rates
15-19	26730	600	0.95
20-24	19725	630	0.93
25-29	18600	800	0.90
30-34	18000	1900	0.85
35-39	17000	1600	0.80
40-44	16500	800	0.75
45-49	15000	630	0.72

b) From the following data show that town B is healthier.

Age group (in years)	Deaths/1000 population		Standard c population
	Town A	Town B	
<10	18	12	15,000
10-30	6	4	18,000
30-50	8	8	22,000
50-70	10	9	12,000
70+	80	90	8,000

38. Compute Fisher's index number and show that it satisfies T.R.T and F.R.T.

Commodity	2008		2012	
	Price (Rs)	Expenditure	Price (Rs)	Expenditure
A	5	25	10	60
B	1	10	2	24
C	4	16	8	40
D	2	40	5	75

39. Fit a parabolic trend of the equation : $y = a + bx + cx^2$ for the following time series regarding the students strength.

Year	2008	2009	2010	2011	2012
Students (in 00's)	100	120	160	240	300

40. Fit a Poission distribution to the following data and test for goodness of fit at 5% L.O.S

No of mistakes per page	0	1	2	3	4
No of pages	31	34	21	12	02

Section – E

V. Answer any TWO of the following: **2× 5 = 10**

41. Weekly wages of workmen are normally distributed around a mean of Rs 700and the S .D of Rs 50. Find the probability of workers whose weekly wages the probability of workers whose weekly wages will be a) more than Rs 800 b) between Rs 690 amd Rs 720.

42. A machine produced 5 defective articles among 80, after some repair the machine produced defective articles among 60. Test whether the proportion of defective articles have reduced after repair at 5% L.O.S.
43. The proportion of vegetarians in south India is 0.72 and that of North India is 0.69 a random sample of 70 men from south India and 75 men from north India is taken. Find mean of of $(p_1 – p_2)$ and the standard error of $(p_1 – p_2)$.
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 per unit is Rs 3 per unit. Find
    i) E.O.Q ii) time between orders.

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