GOVERNMENT OF KARNATAKA
KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD
II PUC MODEL QUESTION PAPER – 2 (2024-25)
STATISTICS (31)

Time: 3 Hours **(Total number of questions: 38)** **Max. Marks: 80**

Instructions:

1. Statistical table and graph sheets will be supplied on request.
2. Scientific calculators are allowed.
3. All working steps should be clearly shown.
4. For Section – A, only the first written answers will be considered for evaluation.
5. For questions 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 most appropriate answer from the choices given: **(5 X 1 = 5)**

1) In a life table, generally the size of the cohort is
a) 100 b) 1,000 c) 10,000 d) 1,00,000

2) Paasche's index number satisfies
a) Unit test b) Circular test c) Time reversal test d) Factor reversal test

3) In a Binomial distribution, if n=5 and p=0.4, then the relation between mean and mode is
a) Mean > Mode b) Mean < Mode c) Mean = Mode d) Mean ≠ Mode

4) The probability of rejecting the null hypothesis, when it is actually not true is called
a) Size of a test b) Power of a test c) Type – I error d) Type – II error

5) The maximum of the row minimums is known as
a) Minimax b) Maximin c) Saddle point d) Strategy

II. Fill in the blanks by choosing the appropriate answers given in the brackets: **(5 X 1 = 5)**
(Chance, Assignable, Averages, Setup, $\bar{x}$, 2n)

6) Index numbers are specialized type of _____.

7) The variance of a chi-square distribution with parameter 'n' is _____.

8) The best estimator of the population mean is _____.

9) A small amount of variation for which no cause can be attributed is termed as _____ cause of variation.

10) Inventory reduces the _____ cost.

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

11)

A	**B**
a. N.R.R. per woman = 0.9	i. x = 0, 1
b. Base period	ii. Game theory
c. Range of Bernoulli distribution	iii. Population is increasing
d. Estimate	iv. Economically stable
e. Dominance principle	v. Population is decreasing
	vi. Likely value of unknown parameter

IV. Answer the following questions: **(5 X 1 = 5)**

12) Define fecundity.

13) Mention a factor which causes seasonal variation in time series.

14) For what value of 'p' binomial distribution is symmetrical?

15) Write the formula to find the standard error of sample proportion.

16) Mention a need for replacement of an equipment.

SECTION – B

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

17) State the different phases of a business cycle.

18) Define 'interpolation' and 'extrapolation'.

19) If p = 0.8, find the standard deviation of Bernoulli distribution.

20) Mention two features of student's t- distribution.

21) Define 'parameter' and 'statistic'.

22) Given $\bar{x}$ = 153cm, μ = 151cm, s = 3cm and n = 10, calculate test statistic 't'.

23) In statistical quality control, name the control charts for variables.

24) Find the maximum inventory level if Q^0 = 400 units, C_1 = Rs 10/unit/year and C_2 = Rs 15/unit/year.

SECTION – C

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

25) Compute the value index number for the following data and write your conclusion on result.

Commodities	2019		2023	
	Price (in Rs)	Quantity	Price (in Rs)	Quantity
A	10	05	12	04
B	15	08	18	07
C	06	03	04	05
D	03	04	03	05

26) Interpolate and extrapolate the sales of a business concern for the years 2015 and 2019 from the following data.

Year	2014	2015	2016	2017	2018	2019
Sales (in Lakh Rs)	13	-	25	38	65	-

27) It has been found that on an average 3 patients visit the doctor during one hour. Find the probability that during a particular hour, (i) 2 patients visit (ii) at least one patient visits the doctor.

28) In a hyper-geometric distribution, if a = 6, b = 9 and n = 4, find (i) P(X = 2) (ii) standard deviation.

29) Variance of 10 observations drawn from a population is 30. Can we conclude that population variance is less than 45? (Use 5% level of significance).

30) Find an initial basic feasible solution for the following transportation problem by matrix minima method and compute the total transportation cost.

		To			Supply
		D_1	D_2	D_3	
From	O_1	8	4	12	500
	O_2	10	5	6	200
	O_3	7	5	3	100
Demand		400	200	200	800

31) The cost of a machine is Rs 5700 and its scrap value is Rs 700. The maintenance costs in different years are as follows:

Year	1	2	3	4	5	6
Maintenance cost (Rs)	200	350	450	600	900	1800

Find the annual average cost and the optimal replacement period of the machine.

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

32) Daily wages of 50 workers are normally distributed with mean Rs 500 and standard deviation Rs 40. Find the number of workers getting wages between Rs 380 and Rs 460.

33) Test whether the means differ significantly at 5% level of significance, from the following data.

Sample	Size	Mean	Standard Deviation
I	40	70	8
II	60	74	12

34) Ten samples of 100 each of P.V.C. pipes manufactured by a firm are inspected for number of defectives. The number of defective pipes are noted as below:
1, 2, 3, 0, 3, 2, 4, 5, 6, 4.
Calculate control limits for np- chart.

35) Solve the following linear programming problem graphically:
Minimize $Z = 10x + 15y$
Subject to constraints: $3x + 2y \leq 18$
$4x + 3y \geq 12$
and $x, y \geq 0$

SECTION – D

VIII. Answer any TWO of the following questions: (2 X 10 = 20)

36) Calculate standardized death rates for the following data and state which locality is more healthier.

Age group (in years)	Locality – A		Locality – B		Standard population
	Population	Deaths	Population	Deaths	
0 – 10	6000	48	5000	45	4000
10 – 25	11000	77	10000	100	14000
25 – 60	18000	216	17000	187	20000
60 & above	5000	175	4000	168	2000

37) a) Calculate the simple geometric mean price index number for the following data.

Items		A	B	C	D
Price (in Rs)	2018	10	12	8	20
	2023	15	21	10	30

b) Compute cost of living index number by using aggregative expenditure method and comment.

Commodities	Base year quantity	Price per unit (in Rs)	
		Base year	Current year
A	10	03	06
B	15	06	05
C	20	07	10
D	12	05	08
E	08	10	12

38) Fit a second degree trend equation of the form $y = a + bx + cx^2$ by the method of least squares to the following time series data. Estimate the value for 2024.

Year	2020	2021	2022	2023
Value	32	20	23	25

SECTION - E
(For Visually challenged students only)

35) A resourceful home decorator manufactures two types of lamps A and B. Both the lamps go through two technicians, a cutter and a finisher. Lamp A requires two hours of cutter's time and one hour of finisher's time. Lamp B requires one hour of cutter's time and two hours of finisher's time. The cutter has 104 hours and finisher has 76 hours of available time per month. Profit on one lamp of A variety is Rs.10 and B variety is Rs.12. Formulate an L.P.P.

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