GOVERNEMENT OF KARNATAKA

KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD

6th CROSS, MALLESHWARAM, BENGALURU-560 003

2025-26 II PUC MODEL QUESTION PAPER- 1

Subject: 31 - Statistics **Maximum Marks:** 80

Time: 3.00 Hours **No. of Questions:** 38

Instructions:

1. Statistical tables 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' questions, only the first written answers will be considered for evaluation.
5. For the question having graph, alternative question is 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) The life expectancy of a new born baby

a) Radix b) Longevity c) Fertility d) Fecundity

2) The prices of items decreased by 10% in 2024 as compared to 2020. The index number for the year 2024 is

a) 10 b) 90 c) 100 d) 110

3) In a Poisson distribution, if $\lambda = 2$, the values of the modes are

a) 0, 3 b) 0, 4 c) 3, 4 d) 1, 2

4) Type – I error is

a) Rejecting H_0 when it is true b) Rejecting H_0 when it is not true

c) Accepting H_0 when it is true d) Accepting H_0 when it is not true

5) In inventory theory, shortage cost per unit good per unit time is denoted by

a) P b) C_1 c) C_2 d) C_3

II. Fill in the blanks by choosing the appropriate answers given in the brackets: **(5 X 1 = 5)**

(Chance, Parameter, $\Sigma a_i = \Sigma b_j$, Retail, 1, 0)

6) The _____ price of the commodities used in the construction of cost of living index number.

7) The value of variance and standard deviation of a standard normal distribution is _____.

8) A statistical constant of the population is called a _____.

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

10) A transportation problem is said to be balanced if and only if _____.

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

11)

A	B
a. 15 – 49 years	i. Leptokurtic
b. Laspeyre's price index	ii. Left tailed test
c. Chi-square distribution curve	iii. Child bearing age of females
d. $H_1: P < P_0$	iv. Transportation problem
e. Least cost entry method	v. Upward bias
	vi. Downward bias

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

12) Mention one of the uses of vital statistics.

13) Define time series.

14) Write the mean of a Bernoulli distribution.

15) Write the formula of S.E.(p).

16) Mention a need for replacement of equipment.

SECTION – B

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

17) Mention a factor causing following variations in a time series:

(i) Seasonal variation (ii) Cyclical variation

18) Write two conditions for applying binomial expansion method of interpolation and extrapolation.

19) In a Poisson distribution, if $P(X = 0) = 0.1225$, write the probability mass function.

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

21) Define: 'Point estimation' and 'interval estimation'.

22) In a paired t-test, if $n = 5$, $\bar{d} = 3$, and $S_d = 2$, then what would be the value of the test statistic?

23) In statistical quality control, if $\overline{X}' = 65$, $\sigma' = 5$, and $n = 5$, then write the upper control limit of $\overline{X}$-chart.

24) For an equipment the fourth year depreciation cost is Rs 6,000 and the cumulative maintenance cost is Rs 6,200. Find the average annual cost.

SECTION – C

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

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

Item	Price (in Rs)	
	Base year	Current year
A	14	21
B	12	09
C	20	27
D	28	25

26) Interpolate the value of 'Y' when X = 70 by using Newton's advancing difference method from the following data.

X	20	40	60	80	100
Y	20	32	54	90	144

27) Four fair coins are tossed 96 times. Find the expected frequencies of number of heads obtained.

28) Find the mean and variance of a hyper-geometric distribution with parameters a =4, b = 8, and n = 6.

29) A sample of 64 students taken from a school. The mean and standard deviation of their heights are 151 cm and 4 cm respectively. Test at 1% level of significance that average height of students is 150 cm.

30) Solve the following game by using maximin-minimax principle. Is the game fair?

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

31) There is a demand for 10,000 items per year. The replenishment cost is Rs 200 and the maintenance cost is Rs 10 per year. Replenishment is instantaneous and shortages are not allowed. Find:
(i) Economic order quantity
(ii) Re-order time.

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

32) The weight of persons is normally distributed with mean 70 kg and standard deviation 4 kg. Find the probability that a randomly selected person whose weight is:
(i) more than 62 kg
(ii) less than 74 kg.

33) In 60 throws of a single die, the following distribution of faces are obtained:

Face	1	2	3	4	5	6	Total
Frequency	15	8	14	12	6	5	60

Test at 5% level of significance that the die is unbiased.

34) Following are the number of defects observed in a process. Obtain the suitable control limits.

Sample number	1	2	3	4	5	6	7	8
Number of defects	1	6	5	7	5	2	1	3

35) Solve the following linear programming problem graphically:
Minimize $Z = 10x + 8y$
Subject to constraints: $4x + y \geq 40$
$2x + 3y \geq 60$
and $x, y \geq 0$

SECTION – D

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

36) Calculate gross reproduction rate and net reproduction rate for the following data and comment on the result.

Age group (in years)	Female population	Female births	Survival ratio
15 – 19	2000	24	0.9
20 – 24	3000	204	0.9
25 – 29	5000	400	0.9
30 – 34	6000	336	0.8
35 – 39	4000	120	0.8
40 – 44	3500	70	0.7
45 – 49	2500	15	0.7

37) Show that Fisher's index number satisfies time reversal test and factor reversal test for the following data.

Items	2019		2024	
	Price (in Rs)	Quantity	Price (in Rs)	Quantity
A	10	15	14	25
B	14	20	20	30
C	17	30	15	45
D	20	25	30	32

38) a) Find the trend values by five yearly moving averages for the following time series data. **(05)**

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024
Value	40	44	41	47	43	55	54	56	62

b) Fit a straight line trend equation of the form $y = a + bx$ to the time series data given below. **(05)**

Year	2014	2016	2018	2020	2022	2024
Profit (Lakh Rs)	12	10	20	25	30	41

SECTION - E
(For Visually challenged students only)

35) A tailor gets a profit of Rs.200 from a shirt and Rs. 300 from a pant. In a week from available 56 hours, he uses 36 hours for cutting and 20 hours for stitching. For cutting he requires 2 hours for a shirt and 3 hours for a pant. He requires 1 hour for stitching a shirt and 2 hours for stitching a pant. Formulate the linear programming problem.

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