



LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

P.G. DEGREE EXAMINATION – CROSS DISCIPLINARY

SECOND SEMESTER – APRIL 2025

PST2CD01 – STATISTICAL ANALYSIS



Date: 05-05-2025

Dept. No.

Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A – K1 (CO1)

Answer ALL the questions

(5 x 1 = 5)

1 Define the following

- a) Conditional probability
- b) Normal Distribution
- c) Population and Sample
- d) Chi-square test
- e) Rank Correlation

SECTION A – K2 (CO1)

Answer ALL the questions

(5 x 1 = 5)

2 Fill in the blanks

- a) The probability that a leap year will have 53 Sundays is _____.
- b) The range of Poisson distribution is _____.
- c) The degree of freedom of the chi-square distribution for the goodness of fit is _____.
- d) _____ test is used to compare the means of two independent groups.
- e) The range of Karl Pearson's coefficient of correlation is _____

SECTION B – K3 (CO2)

Answer any THREE of the following

(3 x 10 = 30)

- 3 A box contains 8 red, 3 white and 9 blue balls. 3 balls are drawn at random, find the probability that (a) all are red (b) all are white (c) 2 are red and 1 is white (d) atleast one is white (e) one of each color is drawn.
- 4 The local authorities in a certain city install 10,000 electric lamps in the street of the city. If these lamps have an average life of 1000 burning hours with a standard deviation of 200 hours, assuming normality, what number of lamps might be expected to fail (i) in the first 800 burning hours (ii) between 800 and 1200 burning hours?
- 5 An intelligence test was administered to 5 persons before and after they were trained. The results are as follows:

Candidates	1	2	3	4	5
IQ (before training)	120	130	135	142	135
IQ (after training)	130	128	135	146	131

Test whether there is any change in IQ after the training programme at 1% level of significance.

6	The following table gives the number of aircraft accidents that occurs during the various days of the week. Find the whether the accidents are uniformly distributed over the week.																
	<table><tr><td>Days</td><td>Sun</td><td>Mon</td><td>Tues</td><td>Wed</td><td>Thurs</td><td>Fri</td><td>Sat</td></tr><tr><td>No. of accidents</td><td>14</td><td>16</td><td>8</td><td>12</td><td>11</td><td>9</td><td>14</td></tr></table>	Days	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	No. of accidents	14	16	8	12	11	9	14
Days	Sun	Mon	Tues	Wed	Thurs	Fri	Sat										
No. of accidents	14	16	8	12	11	9	14										

7 Explain the types of correlation.

SECTION C – K4 (CO3)

Answer any TWO of the following (2 x 12.5 = 25)

8 There are 3 boxes, box I contains 3 red and 7 green balls, box II contains 5 red and 3 green balls and box III contains 8 red and 4 green balls. One ball is drawn from one of the boxes and it is found to be red. What is the probability that it comes from (i) Box I (ii) Box II and (iii) Box III.

9 A manufacturer, who produces medicine bottles, finds that 0.1% of the bottles are defective. The bottles are packed in boxes, each containing 500 bottles. A drug manufacturer buys 100 boxes from the producer of bottles. Using poisson distribution, find how many boxes will contain:
(i) no defective (ii) at most 3 defective and (iii) atleast two defective bottles

10 Calculate the Spearman's rank correlation coefficient between marks in accountancy and marks in statistics from the data:

Marks in accountancy	52	63	45	36	72	65	47	25
Marks in statistics	62	53	51	25	79	43	60	33

11 (i) Explain the procedure for testing of hypothesis.
(ii) Differentiate between correction and regression. (7+5.5)

SECTION D – K5 (CO4)

Answer any ONE of the following (1 x 15 = 15)

12 Calculate the regression equations of X on Y and Y on X from the following data.

X	10	12	13	17	18	20	24	30
Y	5	6	7	9	13	15	20	21

Find the estimate of X when Y=26.

13 Two researchers adopted different sampling techniques while investigating the same group of students to find the number of students falling in different intelligence level. The results are as follows:

Researcher	Below Average	Average	Above Average	Genius
A	86	60	44	10
B	40	33	25	2

Would you say that the sampling techniques adopted by the two researches are significantly different? (Given 5% value of χ^2 for 2 d.f and 3 d.f are 5.991 and 7.82 respectively)

SECTION E – K6 (CO5)

Answer any ONE of the following (1 x 20 = 20)

14 Calculate the Karl Pearson's coefficient of correlation between X and Y from the following data:

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

15 Two random samples drawn from two normal populations are:

Sample I	9	11	13	11	15	9	12	14
Sample II	10	12	10	14	9	8	10	-

Obtain estimates of the variances of the populations and test whether the populations have same variances at 5% level of significance.

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