LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **ALLIED REQUIRED**

SECOND SEMESTER – **APRIL 2024**

UST 2301 – BUSINESS STATISTICS

Date: 06-04-2024 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	SECTION A - K1 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
1.	**Answer the following**
a)	Find the range and the coefficient of range for the following data: 35, 40, 52, 29, 51, 46, 27, 30, 23.
b)	Define positive correlation.
c)	What are regression coefficients?
d)	Mention a merit of freehand graphical method in finding trend line in a time series.
e)	Write down the general formulation of a linear programming problem.
2.	**Fill in the blanks**
a)	Th formula for coefficient of variance is _____.
b)	The value of correlation coefficient lies between _____ and _____.
c)	The normal equations of fitting a straight line are _____.
d)	Secular trend refers to _____ variations.
e)	Graphical method of solving L.P.P is useful when the number of variables is _____.
	SECTION A - K2 (CO1)
	Answer ALL the Questions **(10 x 1 = 10)**
3.	**Choose the correct answer for the following**
a)	The empirical relation connecting mean, median and mode is (i) Mean + mode = 3(median + mode) (ii) Mean – Mode = 3 (Mean – Median) (iii) Mode = 3 (Mean +2 Median) (iv) None of the above
b)	If the correlation coefficient is equal to -1, then it is called _____ correlation. (i) Perfect positive correlation (ii) No correlation (iii) Perfect negative correlation (iv) None of the above
c)	How many normal equations are in second degree parabola method? (i) 1 (ii) 2 (iii) 3 (iv) 4
d)	Business cycle is a common example of (i) Secular trend (ii) Seasonal variations (iii) Cylical variations (iv) Irregular variations
e)	A basic feasible solution to a $(m \times n)$ transportation problem is said to be a non-degenerate basic

feasible solution if it contains

(i) Less than $m + n - 1$ non-negative allocations
(ii) Exactly $m + n - 1$ non-negative allocations
(iii) Greater than $m + n - 1$ non-negative allocations
(iv) None of the above

4. **Say TRUE or FALSE**

a) In a perfectly symmetric distribution, mean, median and mode coincide.

b) Coefficient of correlation is the geometric mean of regression coefficient.

c) The principle of least square is used for fitting the curve.

d) Seasonal variations are long-term periodic movements.

e) The transportation problem has a solution if and only if the problem is balanced.

SECTION B - K3 (CO2)

Answer any TWO of the following (2 x 10 = 20)

5. The weekly salaries of a group of employees are given in the following table. Find the mean and standard deviation of the salaries.

Salary (in Rs.)	75	80	85	90	95	100
No. of Persons	3	7	18	12	6	4

6. Calculate the rank correlation coefficient for the following data:

X	10	14	15	28	35	48
Y	74	61	50	54	43	26

7. Using the appropriate regression line, find y when $x = 64$ from the following data.

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

8. The sale of commodity in tonnes varied from January 2020 to December 2020 in the following manner:

Jan – June:	280	300	280	280	270	240
July – Dec:	230	230	220	200	210	200

Fit a trend line by the method of semi averages.

SECTION C – K4 (CO3)

Answer any TWO of the following (2 x 10 = 20)

9. Calculate the mean, median and mode for the following data. Further, analyse the results with the empirical formula.

Class Interval	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Frequency	3	7	13	17	12	10	8	8	6	6

10. Fit a parabolic curve of regression of y on x to the nine pairs of values:

x	1	2	3	4	5	6	7	8	9
y	2	6	7	8	10	11	11	10	9

11. Calculate trend values by the method of least square from the data below and estimate the sales for 2003.

Year	1996	1997	1998	1999	2000
Sales (Rs. lakhs)	70	74	80	86	90

12. Apply graphical method to solve the LPP:
Maximize $Z = x_1 - 2x_2$
Subject to the constraints $-x_1 + x_2 \leq 1$

$6x_1 + 4x_2 \geq 24$
$0 \leq x_1 \leq 5$ and $2 \leq x_2 \leq 4$.

SECTION D – K5 (CO4)

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

13. (a) An incomplete frequency distribution for 230 data is given below:

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	16	_	_	_	6	4

Determine the missing frequencies of the table, given their median is 33.5 and mode is 34. Also, estimate mean using empirical relation. **(10 marks)**

(b) Fit a straight line for the following data:

Year	1969	1970	1971	1972	1973	1974	1975	1976
Sales (in Lakhs of Rupees)	38	40	65	72	69	60	87	95

Also, estimate the sales for 1977. **(10 marks)**

14. Find the non-degenerate basic feasible solution for the following transportation problem using (i) North west corner rule and (ii) Least cost method.

	To				Supply
From	10	20	5	7	10
	13	9	12	8	20
	4	5	7	9	30
	14	7	1	0	40
	3	12	5	19	50
Demand	60	60	20	10	

SECTION E – K6 (CO5)

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

15. (a) Determine the Bowley's coefficient of skewness for the following data:

Mid value	21	27	33	39	45	51	57
Frequency	18	22	40	50	38	12	4

(10 marks)

(b) Ten teams participated in a variety event conducted by Loyola College were ranked by the three judges Vijay, Ajith and Surya in the following order:

Ranks by Vijay	1	4	6	3	2	9	7	8	10	5
Ranks by Ajith	2	6	5	4	7	10	9	3	8	1
Ranks by Surya	3	7	4	5	10	8	9	2	6	1

Using rank correlation method, analyse which pair of judges has the nearest approach to common likings in variety event.? **(10 marks)**

16. Obtain the optimum basic feasible solution to the following transportation problem:

		Market					
		A	B	C	D	E	Available
Factory	P	4	1	2	6	9	100
	Q	6	4	3	5	7	120
	R	5	2	6	4	8	120
Demand		40	50	70	90	90	

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