LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **ALLIED**

SECOND SEMESTER – **APRIL 2023**

UST 2301 – BUSINESS STATISTICS

Date: 10-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

	SECTION A - K1 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
1.	**Answer the following**	
a)	State Empirical formula for finding mode.	
b)	Define correlation.	
c)	List the components of time series.	
d)	State any one of the properties of regression co-efficients.	
e)	Mention any two methods for finding an initial basic feasible solution in transportation problem.	
2.	**Choose the correct answer for the following.**	
a)	The arithmetic mean of 12,15,10,9,11,14,6 is a)20 b) 11 c)15 d) 35	
b)	The least squares estimate can be obtained from a) Probability equations b) Celestial equations c) Normal equations d)Observed equations	
c)	An orderly set of data arranged in accordance with their time of occurrence is called a)Arithmetic series b) Harmonic series c)Geometric series d)Time series	
d)	The slope and intercept of Y= 21-3X are a)-3, 21 b) 21,-3 c)3,-21 d)-21,3	
e)	The following is called unit cost penalty method. a)Row minima Method b)Column minima method c)Least cost entry method d) Vogel's approximation method.	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Fill in the blanks**	
a)	_____ is the value which occurs most often.	
b)	_____ correlation means that the two variables are deviated in the same direction.	
c)	A fire in a factory delaying production for some weeks is _____ trend/variation.	

d)	The regression equation of X on Y is _____
e)	A solution is called _____ solution if it minimizes the total transportation cost.
4.	**True or False**
a)	G.M of a given number of values cannot be obtained if one of them is zero.
b)	Correlation coefficient cannot be greater than 1 numerically.
c)	Seasonal variations are oscillatory movements in a time series with the period of oscillation less than one month.
d)	Correlation co-efficient is the arithmetic mean of the two regression coefficients.
e)	In graphical representation the bounded region is known as feasible solution.

SECTION B - K3 (CO2)

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

5. Calculate the mode for the following distribution

Salary(in thousands)	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
No of persons	3	6	10	20	15	5	4	2

6. Seven students have obtained the following ranks in two subjects Statistics and Commerce. Find their rank correlation coefficient.

Rank in Statistics	7	1	3	6	5	3	3
Rank in Commerce	5	1	2.5	2.5	4	7	6

7. Calculate the seasonal indices from the following data using the average method.

Year	1st quarter	2nd quarter	3rd quarter	4th quarter
1974	72	68	80	70
1975	76	70	82	74
1976	74	66	84	80
1977	76	74	84	78
1978	78	74	86	82

8. Find the initial basic feasible solution to the following transportation problem using North- West corner rule. Also find the transportation cost.

	E	F	G	H	Availability
A	4	8	10	16	100
B	7	2	3	1	200
C	5	9	11	2	300
Demand	160	240	105	95	

SECTION C – K4 (CO3)

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

9. Find harmonic mean for the following data.

Height(cms)	120	122	124	126	128	130
No of persons	5	7	9	6	4	10

10. Distinguish between correlation and regression.

11. Using three year moving averages determine the trend and short term fluctuations.

Year	1968	1969	1970	1971	1972	1973	1974	1975	1976
Production in tonnes	21	22	23	25	24	22	25	26	27

12. Solve the following linear programming problem using graphical method.

Max z = $25x_1+40x_2$

Subject to $4x_1+4x_2 \leq 48$; $2x_1+5x_2 \leq 50$; $5x_1 + 3x_2 \leq 60$

where $x_1, x_2 \geq 0$.

SECTION D – K5 (CO4)

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

13. From the following data, determine which product is more stable in prices?

Prices of Product A	20	22	19	23	16
Prices of Product B	10	20	18	12	15

14. (i)Explain scatter diagram for correlation ……..(5 marks)

(ii)Using 1964 as the origin obtain a straight line trend equation by the method of least squares.

Year	1960	1962	1963	1964	1965	1966	1969
Profit(In lakhs)	140	144	160	152	168	176	180

Find the trend value of the missing year 1961. …….(15 marks)

SECTION E – K6 (CO5)

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

15. The following table gives the aptitude test scores and productivity indices of 10 workers selected at random.

Aptitude scores (X)	60	62	65	70	72	48	53	73	65	82
Productivity Index (Y)	68	60	62	80	85	40	52	62	60	81

Find the two regression equations and estimate

(i) The test score of a worker whose productivity index is 75.

(ii) The productivity index of a worker whose test score is 92.

16. For the given transportation problem obtain the initial basic feasible solution by Vogel's approximation Method. Also find optimum solution using MODI method.

Factory	Warehouse				
	W_1	W_2	W_3	W_4	Capacity
F1	10	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Requirement	5	8	7	14	

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