LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **ALLIED**

SECOND SEMESTER – **APRIL 2022**

UST 2301 – BUSINESS STATISTICS

(21 BATCH ONLY)

Date: 27-06-2022 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A

Answer ALL the Questions

1.	**Define the following** **(5 x 1 = 5)**		
a)	Give two features of a good average.	K1	CO1
b)	What is an unbalanced Transportation Problem?	K1	CO1
c)	Define Range.	K1	CO1
d)	Explain Kurtosis.	K1	CO1
e)	List the components of a time series.	K1	CO1
2.	**Fill in the blanks** **(5 x 1 = 5)**		
a)	Correlation coefficient lies between _____.	K1	CO1
b)	Mean deviation is minimum when deviations are taken from _____.	K1	CO1
c)	Harmonic mean is the _____ of the A.M of the reciprocal of the observations of a dataset.	K1	CO1
d)	Graphical method of solving L.P.P is useful when the numbers of variables are _____.	K1	CO1
e)	Independent variable is normally denoted as _____.	K1	CO1
3.	**Match the following** **(5 x 1 = 5)**		
a)	γ_2 1. Moment about an arbitrary quantity	K2	CO1
b)	β_0 2. β_2-3	K2	CO1
c)	Measuring Trend 3. Median	K2	CO1
d)	Second Quartile 4. Method of semi averages	K2	CO1
e)	Raw moments 5. Intercept of a model equation	K2	CO1
4.	**TRUE or FALSE** **(5 x 1 = 5)**		
a)	Harmonic mean is used when the data are given in terms of rates.	K2	CO1
b)	For a symmetric distribution, mean=median=mode	K2	CO1
c)	For a set of observations, Mean-Mode = 3(Mean-Median)	K2	CO1
d)	The collection of all plausible solutions to an L.P.P is called feasible region.	K2	CO1

e)	Sum of squares of deviation about mean is minimum.	K2	CO1

SECTION B

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

5. Compute arithmetic mean for the following data using short-cut method. (K3, CO2)

X	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
f	*2*	*8*	*43*	*133*	*207*	*260*	*213*	*120*	*54*	*9*	*1*

6. From the following data of the sales figures determine the trend line by freehand curve method. (K3, CO2)

Years	1978	'79	'80	'81	'82	'83	'84	'85	'86
Sales	60	80	70	100	80	120	110	140	130

7. Explain types of correlation coefficient with the help of scatter diagram. (K3, CO2)

8. Below are given the figures of production(in thousand quintals) of a sugar factory. (K3, CO2)

Year	1999	2000	2001	2002	2003	2004	2005
Prod.	80	90	92	83	94	98	92

i) Fit a straight line trend.
ii)Plot the figures in the graph and show the trend line
iii) Estimate the production in 2010.

SECTION C

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

9. Calculate the three quartiles from the following data of marks and the no.of students. (K4, CO3)

Marks	*0-10*	*10-20*	*20-30*	*30-40*	*40-50*	*50-60*	*60-70*	*70-80*
Freq.	*5*	*7*	*8*	*12*	*28*	*22*	*10*	*8*

10. Ten competitors in a beauty contest are ranked by three judges in the following order: (K4, CO3)

Judge 1	1	4	6	3	2	9	7	8	10	5
Judge 2	2	6	5	4	7	10	9	3	8	1
Judge 3	3	7	4	5	10	8	9	2	6	1

Use the method of rank correlation coefficient to obtain which pair of judges has the nearest approach to common taste in beauty.

11. Minimize $z=-x_1+2x_2$ subject to the constraints: (K4, CO3)
$-x_1+3x_2 \leq 10$
$x_1+x_2 \leq 6$
$x_1-x_2 \leq 2$
$x_1, x_2 \geq 0$
Use the graphical method to solve the above L.P.P.

12. Explain Simple Linear Regression. (K4, CO3)

SECTION D

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

13. From the following data, calculate seasonal variations by the Ratio to Trend method. K5 CO4

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2010	30	40	36	34
2011	34	52	50	44
2012	40	58	54	48
2013	54	76	68	62
2014	80	92	86	82

14. K5 CO4

a) The average salary of male employees in a firm was 5200 and that of females was 4200. The mean salary of all employees was 5000. Hence find the percentage of male and female employees.

b) The following table shows the distribution of 100 students according to their marks in statistics exam. The median is given by 30 marks. Find the missing frequencies.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	10	-----	25	30	-----	10

SECTION E

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

15. a) The first four moments of a distribution about the number 4 of the variable are -1.5, 17,-30and 108. Find the moments about mean. Also, find β_1 and β_2. Comment on the nature of the distribution. Further, find the first moment about the origin. K6 CO5

b) To find the coefficient of correlation between two variables X and Y from 12 pairs of observations, following calculations were made : $\sum x = 30, \sum y = 5, \quad \sum x^2 = 670, \quad \sum y^2 = 285$ and $\sum xy = 334$. On subsequent verifications, it was found that the pair (x=11,y=4) was copied wrongly, the correct being (x=10,y= 4). Find the correct value of the correlation coefficient.

16. K6 CO5

Supply\ Demand	D1	D2	D3	D4	
S1	11	13	17	14	250
S2	16	18	14	10	300
S3	21	24	13	10	400
	200	225	275	250	

Apply the following methods to find the least transportation cost
i) North-west Corner Rule
ii) Least-Cost Method
iii) Vogel's Approximation Method

##########