



LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Com. DEGREE EXAMINATION – ACCOUNTING AND FINANCE

FIRST SEMESTER – NOVEMBER 2024



UCC1AR01 – BUSINESS STATISTICS AND OPERATIONS RESEARCH

Date: 11-11-2024

Dept. No.

Max. : 100 Marks

Time: 01:00 pm-04:00 pm

SECTION A - K1 & K2 (CO1)

Q.No	Levels	Answer ALL the Questions	(10 x 2 = 20)																				
1	K1	Define statistics.																					
2		Write a short note on the concept of a saddle point.																					
3		Recall the meaning of ‘Skewness’.																					
4		Solve the game G with the following payoff Player B 1 2 Player A 1 <table border="1" style="display: inline-table;"><tr><td>6</td><td>2</td></tr><tr><td>8</td><td>12</td></tr></table> 2 <table border="1" style="display: inline-table;"><tr><td>8</td><td>12</td></tr></table>	6	2	8	12	8	12															
6	2																						
8	12																						
8	12																						
5		Illustrate the applications of Operations research model.																					
6	K2	Contrast between descriptive and inferential data.																					
7		AREA W X Y Z <table border="1" style="display: inline-table;"><tr><td>1</td><td>1</td><td>17</td><td>8</td><td>16</td></tr><tr><td>1</td><td>9</td><td>7</td><td>12</td><td>6</td></tr><tr><td>1</td><td>3</td><td>16</td><td>15</td><td>12</td></tr><tr><td>1</td><td>4</td><td>10</td><td>12</td><td>11</td></tr></table> Find the total minimum cost:	1	1	17	8	16	1	9	7	12	6	1	3	16	15	12	1	4	10	12	11	
1		1	17	8	16																		
1	9	7	12	6																			
1	3	16	15	12																			
1	4	10	12	11																			
8		Describe different components of time series with suitable examples.																					
9		Explain the strategies of a game.																					
10		Find the LPP model to minimize the cost of tonics. <table border="1" style="width: 100%;"><thead><tr><th>Vitamins</th><th colspan="2">Tonics</th><th>Daily requirements in units</th></tr><tr><td></td><th>X</th><th>Y</th><td></td></tr></thead><tbody><tr><td>A</td><td>2</td><td>4</td><td>40</td></tr><tr><td>D</td><td>3</td><td>2</td><td>50</td></tr><tr><td>Cost per unit</td><td>5</td><td>3</td><td></td></tr></tbody></table>	Vitamins	Tonics		Daily requirements in units		X	Y		A	2	4	40	D	3	2	50	Cost per unit	5	3		
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SECTION B – K3 & K4 (CO2)

		Answer ALL the Questions		(4 x 10 = 40)	
11		Calculate the mean, median and mode to the following data: Imagine you are the owner of an ice cream parlor, and you have been keeping track of the number of ice cream cones sold each day over the past two weeks (14 days). Here are your daily sales figures:			
		Day 1:	45 cones	Day 8:	45 cones
		Day 2:	55 cones	Day 9:	70 cones
		Day 3:	60 cones	Day 10:	50 cones
		Day 4:	50 cones	Day 11:	55 cones
		Day 5:	55 cones	Day 12:	55 cones

			Day 6:	40 cones	Day 13:	65 cones							
			Day 7:	60 cones	Day 14:	60 cones							
12	K3	[OR]											
		Ten competitors in a beauty contest are ranked by 3 judges in the following order:											
		1st Judge	2	7	1	5	3	4	8	6	10	9	
		2nd Judge	10	6	3	8	7	2	9	5	4	1	
		3rd Judge	2	5	6	9	1	3	7	4	8	10	
		Use rank correlation coefficient to identify which pair of judges has nearest approach to common taste in beauty.											
13		Elucidate the scope and importance of Operations research with examples.											
14		[OR]											
		Find the IBFS of the Transportation Problem using:											
		Destination											
		1	2	3	4	Available							
		ORIGIN	A	7	2	5	5	30					
a) Least cost method	B		4	4	6	5	15						
b) Vogel's Approximation method	C		5	3	3	2	10						
	D		4	-1	4	2	20						
		Requirement		20	25	15	15						
15	K4	Assuming that trend is absent, determine if there is any seasonality in the data given below:											
		Year	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter							
		2018	3.7	4.1	3.3	3.5							
		2019	3.7	3.9	3.6	3.6							
		2020	4.0	4.1	3.3	3.1							
		2021	3.3	4.4	4.0	4.0							
		What are seasonal indices for various quarters.											
		[OR]											
16			Fit a straight trend line by the method of least squares and estimate the sales for the year 2012.										
			Year	2002	2003	2004	2005	2006	2007	2008	2009		
		Production	76	80	130	144	138	120	174	190			
17		Maximize, $Z = 3x_1 + 2x_2$ Subject to the constraints $3x_1 + 2x_2 \leq 6$; $2x_1 + 3x_2 \leq 6$; x_1 and $x_2 \geq 0$. Solve graphically											
18		[OR]											
		Consider the 4*4 game, which represents the payoff matrix of the player A. Solve it optimally.											
		PLAYER B											
		I	II	III	IV								
		PLAYER A	I	5	-3	3	4						
	II		-4	5	4	5							
	III		4	-4	-3	3							
SECTION C – K5 & K6 (CO3)													
	Answer ALL the Questions (2 x 20 = 40)												
19	K5	Assess the Karl Pearson's coefficient of skewness from the following data and interpret the results.											
		Income (Rs. Per day)	No. of Employees	Income (Rs. Per day)	No. of Employees								
		200 and above	150	450 and above	70								

20		250 and above	140	500 and above	30		
		300 and above	100	550 and above	14		
		350 and above	80	600 and above	0		
		400 and above	80				
		[OR]					
21	K6	Solve the Transportation problem from factory to the warehouse and find the optimal solution.					
			W1	W2	W3	W4	Supply
		F1	19	30	50	10	7
		F2	70	30	40	60	9
		F3	40	8	70	20	18
	Demand	5	8	7	14		
22	K6	a). Analyse the seasonal indices by the ratio to moving average method, from the following data. – (10 Marks)					
		Year	1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter	
		2019	68	62	61	63	
		2020	65	58	66	61	
		2021	68	63	63	67	
b). Distinguish between secular trend, seasonal fluctuations and cyclical fluctuations. How would you measure secular trend to any given time series? – (10 Marks)							
[OR]							
Solve the two regression co-efficient and obtain the lines of regression (equation), taking deviations from actual means of X and Y.							
X	Price (Rs)	10	12	13	12	16	15
Y	Amount Demanded	40	38	43	45	37	43
Estimate the likely demand when the price is Rs. 20							
