

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**B.Com. DEGREE EXAMINATION – COMMERCE****SECOND SEMESTER – APRIL 2022****UBC 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)	Geometric mean.	K1	CO1
b)	Properties of correlation coefficient.	K1	CO1
c)	Components of timeseries.	K1	CO1
d)	Intercept & Slope.	K1	CO1
e)	North-west corner rule.	K1	CO1
2.	Fill in the blanks	(5 x 1 = 5)	
a)	Find the arithmetic mean for the following data: 12, 15, 10, 9, 11, 16, 14, 6 _____	K1	CO1
b)	Write down the formula for Rank Correlation _____	K1	CO1
c)	A time series is arranged in _____ order.	K1	CO1
d)	Linear regression uses one independent variable to explain or predict the outcome of the _____ variable Y	K1	CO1
e)	Expand VAM _____	K1	CO1
3.	Match the following	(5 x 1 = 5)	
a)	GM – (i) Cause and effect relationship	K2	CO1
b)	Error term - (ii) $Y_c = a + bx + cx^2$	K2	CO1
c)	Second degree parabola - (iii) nth root	K2	CO1
d)	Transportation - (iv) Lack of perfect goodness of fit	K2	CO1
e)	Correlation – (v) Minimizes cost		
4.	TRUE or FALSE	(5 x 1 = 5)	
a)	The empirical formula gives the relationship between mean, median and mode.	K2	CO1
b)	In repeated rank correlation, the term m stands for a number of times a value not repeated.	K2	CO1
c)	Time series is nothing but statistical observation arranged in chronological order.	K2	CO1

d)	$Y = \alpha X + \beta \rho + \epsilon$ where: $\alpha, \beta =$ Not Constant	K2	CO1
e)	Linear programming is a mathematical technique to find the best organizational resources.	K2	CO1

SECTION B

Answer any TWO of the following

(2 x 10 = 20)

5	Calculate Bowley's coefficient of skewness from the following data.	K3	CO2																										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Marks</td> <td>0 - 10</td> <td>10 - 20</td> <td>20 - 30</td> <td>30 - 40</td> <td>40 - 50</td> <td>50 - 60</td> <td>60 - 70</td> <td>70 - 80</td> </tr> <tr> <td>No. of persons</td> <td>10</td> <td>25</td> <td>20</td> <td>15</td> <td>10</td> <td>35</td> <td>25</td> <td>10</td> </tr> </table>	Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	No. of persons	10	25	20	15	10	35	25	10										
Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80																					
No. of persons	10	25	20	15	10	35	25	10																					
6.	Write a note on logistic regression.	K3	CO2																										
7.	A sample of 12 fathers and their eldest sons gave the following data about their heights in inches. Find the rank correlation coefficient.	K3	CO2																										
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Father</td> <td>65</td> <td>63</td> <td>67</td> <td>64</td> <td>68</td> <td>62</td> <td>70</td> <td>66</td> <td>68</td> <td>67</td> <td>69</td> <td>71</td> </tr> <tr> <td>Son</td> <td>68</td> <td>66</td> <td>68</td> <td>65</td> <td>69</td> <td>66</td> <td>68</td> <td>65</td> <td>71</td> <td>67</td> <td>68</td> <td>70</td> </tr> </table>	Father	65	63	67	64	68	62	70	66	68	67	69	71	Son	68	66	68	65	69	66	68	65	71	67	68	70		
Father	65	63	67	64	68	62	70	66	68	67	69	71																	
Son	68	66	68	65	69	66	68	65	71	67	68	70																	
8.	Use graphical method to solve the following L.P.P. Maximize $z = 10x + 15y$ Subject to constraints, $2x + y \leq 26$ $2x + 4y \leq 56$ $-x + y \leq 5$ And $x, y \geq 0$	K3	CO2																										

SECTION C

Answer any TWO of the following

(2 x 10 = 20)

9.	You are given below the following information about advertising and sales.	K4	CO3																
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>Adv. Exp (X) (in lakhs)</td> <td>Sales (Y) (in lakhs)</td> </tr> <tr> <td>Mean</td> <td>10</td> <td>90</td> </tr> <tr> <td>S.D.</td> <td>3</td> <td>12</td> </tr> </table> <p>Correlation coefficient = 0.8</p> <ol style="list-style-type: none"> Obtain the two regression lines. Find the likely sales when advertisement expenditure is Rs. 15 lakhs What should be advertisement expenditure if the company wants to attain sales target of Rs.120 lakhs? 		Adv. Exp (X) (in lakhs)	Sales (Y) (in lakhs)	Mean	10	90	S.D.	3	12									
	Adv. Exp (X) (in lakhs)	Sales (Y) (in lakhs)																	
Mean	10	90																	
S.D.	3	12																	
10.	Illustrate and explain. Skewness and kurtosis of a distribution.	K4	CO3																
11.	Calculate 3 yearly moving averages of the production figures given below	K4	CO3																
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Year</td> <td>1995</td> <td>1996</td> <td>1997</td> <td>1998</td> <td>1999</td> <td>2000</td> <td>2001</td> </tr> <tr> <td>Production</td> <td>224</td> <td>213</td> <td>202</td> <td>215</td> <td>222</td> <td>244</td> <td>236</td> </tr> </table>	Year	1995	1996	1997	1998	1999	2000	2001	Production	224	213	202	215	222	244	236		
Year	1995	1996	1997	1998	1999	2000	2001												
Production	224	213	202	215	222	244	236												

12.	Obtain initial basic feasible solution to the following transportation problems using Least Cost Entry Method	K4	CO3																														
	<table border="1"> <thead> <tr> <th>Warehouse/Stores</th> <th>S1</th> <th>S2</th> <th>S3</th> <th>Availability</th> </tr> </thead> <tbody> <tr> <td>W1</td> <td>5</td> <td>4</td> <td>3</td> <td>6</td> </tr> <tr> <td>W2</td> <td>4</td> <td>7</td> <td>6</td> <td>8</td> </tr> <tr> <td>W3</td> <td>2</td> <td>5</td> <td>8</td> <td>12</td> </tr> <tr> <td>W4</td> <td>8</td> <td>6</td> <td>7</td> <td>4</td> </tr> <tr> <td>Requirement</td> <td>8</td> <td>10</td> <td>12</td> <td>30</td> </tr> </tbody> </table>	Warehouse/Stores	S1	S2	S3	Availability	W1	5	4	3	6	W2	4	7	6	8	W3	2	5	8	12	W4	8	6	7	4	Requirement	8	10	12	30		
Warehouse/Stores	S1	S2	S3	Availability																													
W1	5	4	3	6																													
W2	4	7	6	8																													
W3	2	5	8	12																													
W4	8	6	7	4																													
Requirement	8	10	12	30																													

SECTION D

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

13.	Calculate the mode from the following data:	K5	CO4																
	<table border="1"> <tbody> <tr> <td>x</td> <td>25</td> <td>30</td> <td>35</td> <td>40</td> <td>45</td> <td>50</td> <td>55</td> </tr> <tr> <td>f</td> <td>7</td> <td>11</td> <td>17</td> <td>15</td> <td>14</td> <td>10</td> <td>11</td> </tr> </tbody> </table>	x	25	30	35	40	45	50	55	f	7	11	17	15	14	10	11		
x	25	30	35	40	45	50	55												
f	7	11	17	15	14	10	11												
14.	Fit a straight-line trend to the data by the method of least square.	K5	CO4																
	<table border="1"> <tbody> <tr> <td>Year</td> <td>1960</td> <td>1962</td> <td>1963</td> <td>1964</td> <td>1965</td> <td>1966</td> <td>1969</td> </tr> <tr> <td>Value</td> <td>140</td> <td>144</td> <td>160</td> <td>152</td> <td>168</td> <td>176</td> <td>180</td> </tr> </tbody> </table> <p>Find the trend value of the missing year 1961.</p>	Year	1960	1962	1963	1964	1965	1966	1969	Value	140	144	160	152	168	176	180		
Year	1960	1962	1963	1964	1965	1966	1969												
Value	140	144	160	152	168	176	180												

SECTION E

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

15.	Calculate the regression equation of X on Y and Y on X from the following data and estimate X when Y = 26	K6	CO5																																				
	<table border="1"> <tbody> <tr> <td>X</td> <td>10</td> <td>12</td> <td>13</td> <td>17</td> <td>18</td> <td>20</td> <td>24</td> <td>30</td> </tr> <tr> <td>Y</td> <td>5</td> <td>6</td> <td>7</td> <td>9</td> <td>13</td> <td>15</td> <td>20</td> <td>21</td> </tr> </tbody> </table>	X	10	12	13	17	18	20	24	30	Y	5	6	7	9	13	15	20	21																				
X	10	12	13	17	18	20	24	30																															
Y	5	6	7	9	13	15	20	21																															
16.	Obtain optimal solution by using MODI method.	K6	CO5																																				
	<table border="1"> <thead> <tr> <th>Factory/ Warehouse</th> <th>W1</th> <th>W2</th> <th>W3</th> <th>W4</th> <th>Availability</th> </tr> </thead> <tbody> <tr> <td>F1</td> <td>48</td> <td>60</td> <td>56</td> <td>58</td> <td>140</td> </tr> <tr> <td>F2</td> <td>45</td> <td>55</td> <td>53</td> <td>60</td> <td>260</td> </tr> <tr> <td>F3</td> <td>50</td> <td>65</td> <td>60</td> <td>62</td> <td>360</td> </tr> <tr> <td>F4</td> <td>52</td> <td>64</td> <td>55</td> <td>61</td> <td>220</td> </tr> <tr> <td>Requirement</td> <td>200</td> <td>320</td> <td>250</td> <td>210</td> <td>980</td> </tr> </tbody> </table>	Factory/ Warehouse	W1	W2	W3	W4	Availability	F1	48	60	56	58	140	F2	45	55	53	60	260	F3	50	65	60	62	360	F4	52	64	55	61	220	Requirement	200	320	250	210	980		
Factory/ Warehouse	W1	W2	W3	W4	Availability																																		
F1	48	60	56	58	140																																		
F2	45	55	53	60	260																																		
F3	50	65	60	62	360																																		
F4	52	64	55	61	220																																		
Requirement	200	320	250	210	980																																		
