

--	--	--	--	--	--	--	--

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.



UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2025.

(For those admitted in June 2023 and later)

PROGRAMME AND BRANCH: B.Com.

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
III	PART -III	CORE -6	U23CO306	BUSINESS MATHEMATICS AND STATISTICS

Date & Session: 10.11.2025/AN

Time : 3 hours

Maximum: 75 Marks

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer <u>ALL</u> Questions.
CO1	K1	1.	If $\log_3 x = 2$ then the value of x is ____. a) 0 b) 8 c) 1 d) 9
CO1	K2	2.	If $A:B:C=3:4:7$, then the ratio $(A+B+C):C$ is equal to _____. a) 2:1 b) 1:2 c) 1:1 d) 3:2
CO2	K1	3.	Which of the following is NOT a valid operation for matrices? a) Addition b) Subtraction c) Multiplication d) Division
CO2	K2	4.	Cramer's Rule is also known as _____. a) Inverse Matrix Method b) Matrix Method c) Determinant Method d) Inverse Method
CO3	K1	5.	_____ is the difference between the largest value and the smallest value of the variables. a) Arithmetic Mean b) Median c) Mode d) Range
CO3	K2	6.	The relative measure of standard deviation is called the _____. a) Coefficient of Correlation b) Coefficient of regression c) Coefficient of Variation d) Coefficient of Con-current Deviation
CO4	K1	7.	If two variables tend to move in the same direction, the correlation is called. a) Positive correlation b) negative correlation c) no correlation d) high degree of correlation
CO4	K2	8.	Two regression lines will coincide each other when _____. a) -1 b) +1 c) 0 d) either -1 or +1
CO5	K1	9.	An index number used for measuring the changes in prices of commodities over a period of time is _____. a) Price index b) Quantity index c) Value index d) Fishers index
CO5	K2	10.	The formula to construct Laspeyre's index is _____. a) $\frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100$ b) $\frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$ c) $\frac{\sum p_0 q_1}{\sum p_1 q_1} \times 100$ d) $\frac{\sum p_1 q_1}{\sum p_0 q_0} \times 100$

Course Outcome	Bloom's K-level	Q. No.	SECTION – B (5 X 5 = 25 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)																							
CO1	K3	11a.	Two numbers are in the ratio 3:4. If 6b added to each term of the ratio then the new ratio will be 4:5. Find the numbers.																							
CO1	K3	11b.	(OR) Find the value of $\frac{(15.46)^2 * (232)^{1/3}}{(488.2)^{1/3} * 73.5}$																							
CO2	K3	12a.	If $A = \begin{bmatrix} 2 & -1 & 0 & 5 \\ 3 & 2 & 6 & -4 \end{bmatrix}$ $B = \begin{bmatrix} 4 & 7 & 1 & 8 \\ -2 & 3 & 6 & 5 \end{bmatrix}$ Find 2A+3B and 3A-2B.																							
CO2	K3	12b.	(OR) If $B = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$, find adj. B.																							
CO3	K4	13a.	Find Geometric mean of the following: 0.75, 0.038, 675.35, 1.59, 95.78																							
CO3	K4	13b.	(OR) Find the mode of the following distribution: <table><tr><th>Class limits</th><th>Frequency</th></tr><tr><td>46-50</td><td>2</td></tr><tr><td>51-55</td><td>3</td></tr><tr><td>56-60</td><td>5</td></tr><tr><td>61-65</td><td>7</td></tr><tr><td>66-70</td><td>9</td></tr><tr><td>71-75</td><td>11</td></tr><tr><td>76-80</td><td>7</td></tr><tr><td>81-85</td><td>2</td></tr><tr><td>86-90</td><td>3</td></tr><tr><td>91-95</td><td>1</td></tr></table>		Class limits	Frequency	46-50	2	51-55	3	56-60	5	61-65	7	66-70	9	71-75	11	76-80	7	81-85	2	86-90	3	91-95	1
Class limits	Frequency																									
46-50	2																									
51-55	3																									
56-60	5																									
61-65	7																									
66-70	9																									
71-75	11																									
76-80	7																									
81-85	2																									
86-90	3																									
91-95	1																									
CO4	K4	14a.	Find the co-efficient of correlation between x and y. <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>y</td><td>12</td><td>11</td><td>13</td><td>15</td><td>14</td><td>17</td><td>16</td><td>19</td><td>18</td></tr></table>		x	1	2	3	4	5	6	7	8	9	y	12	11	13	15	14	17	16	19	18		
x	1	2	3	4	5	6	7	8	9																	
y	12	11	13	15	14	17	16	19	18																	
CO4	K4	14b.	(OR) Find the line of regression of y on x: <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>8</td><td>10</td></tr><tr><td>Y</td><td>9</td><td>8</td><td>10</td><td>12</td><td>14</td><td>16</td><td>15</td></tr></table>		x	1	2	3	4	5	8	10	Y	9	8	10	12	14	16	15						
x	1	2	3	4	5	8	10																			
Y	9	8	10	12	14	16	15																			
CO5	K5	15a.	The sales of a commodity in tonnes varied from January 2019 to December 2019 as follows: <table><tr><td>280</td><td>300</td><td>280</td><td>280</td><td>270</td><td>240</td></tr><tr><td>230</td><td>230</td><td>220</td><td>200</td><td>210</td><td>200</td></tr></table> Fit a trend line by the method of semi-average.		280	300	280	280	270	240	230	230	220	200	210	200										
280	300	280	280	270	240																					
230	230	220	200	210	200																					
CO5	K5	15b.	(OR) From the following chain base index number given below, prepare fixed base index number. <table><tr><td>Year</td><td>2019</td><td>2020</td><td>2021</td><td>2022</td><td>2023</td></tr><tr><td>Index</td><td>110</td><td>160</td><td>140</td><td>200</td><td>150</td></tr></table>		Year	2019	2020	2021	2022	2023	Index	110	160	140	200	150										
Year	2019	2020	2021	2022	2023																					
Index	110	160	140	200	150																					

Course Outcome	Bloom's K-level	Q. No.	SECTION – C (5 X 8 = 40 Marks) Answer ALL Questions choosing either (a) or (b)																						
CO1	K3	16a.	Simplify $\left[\left(\frac{x^{-1}y^2}{x^2y^{-4}}\right)^7 / \left(\frac{x^3y^{-5}}{x^2y^3}\right)^{-5}\right] \left(\frac{x^{-7/2}y^{1/3}}{x^{5/2}y^{10/3}}\right)^{2/3}$ (OR)																						
CO1	K3	16b.	A sinking fund was formed by setting aside ₹ 1,000 at the end of the first year and then at the end of each of the following years an amount 10% more than that set aside at the end of the immediately previous year. Find the total amount of the fund at the end of ten years, reckoning interest at 5 per cent per annum compounded. (Give your answer correct to the nearest rupee).																						
CO2	K4	17a.	If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 2 & -3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ 0 & -1 \end{bmatrix}$, then verify that $A(B+C)=AB+AC$. (OR)																						
CO2	K4	17b.	Find the inverse of the following matrix: $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$																						
CO3	K4	18a.	The mean and SD of 20 items is found to be 10 and 2 respectively. At the time of checking it was found that one item 8 was incorrect. Calculate the mean and SD if the wrong item is replaced by 12. Give the answer correct to 2 places after decimal. (OR)																						
CO3	K4	18b.	Find the Quartiles from the following distribution: <table><tr><th>Age (years)</th><th>No. of employees</th></tr><tr><td>Below 20</td><td>13</td></tr><tr><td>20-25</td><td>29</td></tr><tr><td>25-30</td><td>46</td></tr><tr><td>30-35</td><td>60</td></tr><tr><td>35-40</td><td>112</td></tr><tr><td>40-45</td><td>94</td></tr><tr><td>45-50</td><td>45</td></tr><tr><td>55 and above</td><td>21</td></tr></table>	Age (years)	No. of employees	Below 20	13	20-25	29	25-30	46	30-35	60	35-40	112	40-45	94	45-50	45	55 and above	21				
Age (years)	No. of employees																								
Below 20	13																								
20-25	29																								
25-30	46																								
30-35	60																								
35-40	112																								
40-45	94																								
45-50	45																								
55 and above	21																								
CO4	K5	19a.	The heights (in cms) and in weights (in kgms) of a random sample of 8 adult males are shown in the following data. <table><tr><th>Height (x)</th><td>177</td><td>163</td><td>173</td><td>182</td><td>171</td><td>168</td><td>174</td><td>184</td></tr><tr><th>Weight (y)</th><td>71</td><td>67</td><td>77</td><td>85</td><td>69</td><td>92</td><td>73</td><td>80</td></tr></table> (i) Calculate co-efficient of correlation (ii) Draw the least square regression line of x on y (iii) Draw a scatter diagram and the fitted line x on y. (OR)	Height (x)	177	163	173	182	171	168	174	184	Weight (y)	71	67	77	85	69	92	73	80				
Height (x)	177	163	173	182	171	168	174	184																	
Weight (y)	71	67	77	85	69	92	73	80																	
CO4	K5	19b.	Find the co-efficient of correlation between output and cost of an automobile factory from the following data: <table><tr><td>Output of cars (in '000s)</td><td>3.5</td><td>4.2</td><td>5.6</td><td>6.5</td><td>7.0</td><td>8.2</td><td>8.8</td><td>9.0</td><td>9.7</td><td>10.0</td></tr><tr><td>Cost of cars (Rupees in '000s)</td><td>9.8</td><td>9.0</td><td>8.8</td><td>8.4</td><td>8.3</td><td>8.2</td><td>8.2</td><td>8.0</td><td>8.0</td><td>8.1</td></tr></table> The correlation coefficient is unaffected by the change of origin and the scale.	Output of cars (in '000s)	3.5	4.2	5.6	6.5	7.0	8.2	8.8	9.0	9.7	10.0	Cost of cars (Rupees in '000s)	9.8	9.0	8.8	8.4	8.3	8.2	8.2	8.0	8.0	8.1
Output of cars (in '000s)	3.5	4.2	5.6	6.5	7.0	8.2	8.8	9.0	9.7	10.0															
Cost of cars (Rupees in '000s)	9.8	9.0	8.8	8.4	8.3	8.2	8.2	8.0	8.0	8.1															

			Multiply outputs by 10 and then subtract 35. Multiply the cost (in thousands of rupees) by 10 and subtract 80.																																							
CO5	K5	20a.	Fit a straight line to the following data the least squares method after summing the given quarterly data due to yearly data. <table><tr><th rowspan="2">Year</th><th colspan="4">Export of cotton textiles (Rupees in Million)</th></tr><tr><th>I Quarter</th><th>II Quarter</th><th>III Quarter</th><th>IV Quarter</th></tr><tr><td>2019</td><td>10</td><td>13</td><td>14</td><td>12</td></tr><tr><td>2020</td><td>12</td><td>14</td><td>15</td><td>13</td></tr><tr><td>2021</td><td>13</td><td>15</td><td>18</td><td>14</td></tr><tr><td>2022</td><td>15</td><td>19</td><td>21</td><td>18</td></tr><tr><td>2023</td><td>15</td><td>22</td><td>23</td><td>20</td></tr><tr><td>2024</td><td>20</td><td>21</td><td>25</td><td>20</td></tr></table> Also find out short period fluctuations for the given years using additive model. (OR)	Year	Export of cotton textiles (Rupees in Million)				I Quarter	II Quarter	III Quarter	IV Quarter	2019	10	13	14	12	2020	12	14	15	13	2021	13	15	18	14	2022	15	19	21	18	2023	15	22	23	20	2024	20	21	25	20
Year	Export of cotton textiles (Rupees in Million)																																									
	I Quarter	II Quarter	III Quarter	IV Quarter																																						
2019	10	13	14	12																																						
2020	12	14	15	13																																						
2021	13	15	18	14																																						
2022	15	19	21	18																																						
2023	15	22	23	20																																						
2024	20	21	25	20																																						
CO5	K5	20b.	Calculate Laspeyre’s Index number, Passche’s price index number and Marshall-Edgeworth Index for the following data: <table><tr><th rowspan="2">Commodity</th><th colspan="2">2020</th><th colspan="2">2021</th></tr><tr><th>Price in ₹</th><th>Qty in kgs.</th><th>Price in ₹</th><th>Qty in kgs.</th></tr><tr><td>A</td><td>20</td><td>15</td><td>30</td><td>10</td></tr><tr><td>B</td><td>30</td><td>18</td><td>40</td><td>15</td></tr><tr><td>C</td><td>10</td><td>20</td><td>45</td><td>10</td></tr><tr><td>D</td><td>15</td><td>25</td><td>25</td><td>5</td></tr></table>	Commodity	2020		2021		Price in ₹	Qty in kgs.	Price in ₹	Qty in kgs.	A	20	15	30	10	B	30	18	40	15	C	10	20	45	10	D	15	25	25	5										
Commodity	2020		2021																																							
	Price in ₹	Qty in kgs.	Price in ₹	Qty in kgs.																																						
A	20	15	30	10																																						
B	30	18	40	15																																						
C	10	20	45	10																																						
D	15	25	25	5																																						