



SOMAIYA
VIDYA VIHAR UNIVERSITY

Semester: January 2022 – May 2022		
Examination: In-Semester Examination		
Programme code: 1	Class: SY	Semester: IV SVU
Programme:	B.TECH	2020)
Name of the Constituent College: K. J. Somaiya College of Engineering		Name of the department: COMP
Course Code: 116U01C401	Name of the Course: Probability, Statistics and Optimization Techniques	

Question No.		Max. Marks																																								
Q1	Attempt the followings	6																																								
(i)	If $N = 9$, $\sum x = 45$, $\sum y = 108$, $\sum x^2 = 285$, $\sum y^2 = 1356$, $\sum xy = 597$, find correlation coefficient 'r' between variables x & y.																																									
(ii)	If X is Normal variate with mean 50 and variance 16, find $P(40 < X < 60)$																																									
(iii)	If X is Poisson variate such that $P(x=0) = 5P(x=2)$, Find $P(x=3)$																																									
Q2	<p>From the following data, find rank correlation coefficient.</p> <table><tr><td>X</td><td>45</td><td>70</td><td>65</td><td>30</td><td>90</td><td>45</td><td>50</td><td>65</td><td>75</td><td>60</td></tr><tr><td>Y</td><td>35</td><td>90</td><td>70</td><td>40</td><td>95</td><td>40</td><td>40</td><td>80</td><td>80</td><td>50</td></tr></table> <p>OR</p> <p>Obtain regression line of y on x and estimate value of y when $x=71$</p> <table><tr><td>x</td><td>65</td><td>66</td><td>67</td><td>67</td><td>68</td><td>69</td><td>70</td><td>72</td></tr><tr><td>y</td><td>67</td><td>68</td><td>35</td><td>66</td><td>72</td><td>72</td><td>69</td><td>71</td></tr></table>	X	45	70	65	30	90	45	50	65	75	60	Y	35	90	70	40	95	40	40	80	80	50	x	65	66	67	67	68	69	70	72	y	67	68	35	66	72	72	69	71	6
X	45	70	65	30	90	45	50	65	75	60																																
Y	35	90	70	40	95	40	40	80	80	50																																
x	65	66	67	67	68	69	70	72																																		
y	67	68	35	66	72	72	69	71																																		
Q3	Attempt any THREE	18																																								
(i)	<p>The joint probability distribution function of (X,Y) is given by</p> <table><tr><th rowspan="2">X</th><th colspan="3">Y</th></tr><tr><th>1</th><th>2</th><th>3</th></tr><tr><td>0</td><td>3K</td><td>6K</td><td>9K</td></tr><tr><td>1</td><td>5K</td><td>8K</td><td>11K</td></tr><tr><td>2</td><td>7K</td><td>10K</td><td>13K</td></tr></table> <p>(i) Find value of k, (ii) Find the marginal probability distribution of X and (iii) $P(X \leq 1, Y \leq 2)$</p>	X	Y			1	2	3	0	3K	6K	9K	1	5K	8K	11K	2	7K	10K	13K																						
X	Y																																									
	1	2	3																																							
0	3K	6K	9K																																							
1	5K	8K	11K																																							
2	7K	10K	13K																																							
(ii)	Three machines A,B,C produce respectively 50%,30% & 20% of the total number of items of a factory. The percentage of defective outputs of these machines are respectively 2%,3% & 4%.An item is chosen at random and found to be defective . Using Bayes theorem find the probability that it was produced by the factory A																																									
(iii)	X is Uniform Distribution over the range (2,b) such that $P(3 < X < 6) = 0.3$, find mean and variance of X																																									
(iv)	The daily consumption of milk in excess of 20 kilter's in a town is approximately exponentially distributed with parameter $1/3000$. The town has daily stock of 35 kilter's. Find the probability that of 2 days selected at random the stock is sufficient for both days.																																									