

Day and Date: Tuesday, 14/06/2022

Time: 9.30 to 1.15

Max. Marks- 100

Instructions:

1. Question No. 1 is compulsory.
2. Figure to the right indicate **full marks**.
3. Use of **non-programmable** calculator is allowed.

BT	CO's	Q. No.		Marks														
		Q.1	Attempt the following	40														
L3	210.1	a	Calculate mean deviation about the mean for the following data Class Interval: 0–10 10–20 20–30 30–40 40–50 Frequency : 15 18 21 17 12	8														
L3	210.2	b	The table below gives the number of books issued from a DYPCET library on the various days of week <table border="1"><tr><td>Days:</td><td>Mon</td><td>Tue</td><td>Wed</td><td>Thu</td><td>Fri</td><td>Sat</td></tr><tr><td>Books Issued:</td><td>120</td><td>130</td><td>110</td><td>115</td><td>135</td><td>110</td></tr></table> Test whether the issuing books is independent of day. (Given table value of Chi square at 5% level of significance is 11.07)	Days:	Mon	Tue	Wed	Thu	Fri	Sat	Books Issued:	120	130	110	115	135	110	8
Days:	Mon	Tue	Wed	Thu	Fri	Sat												
Books Issued:	120	130	110	115	135	110												
L3	210.3	c	Calculate the Karl Pearson's coefficient of correlation for the following bivariate data x : 28 45 40 38 35 33 40 32 36 33 y : 23 34 33 34 30 26 28 31 36 35	8														
L3	210.3	d	Marks of 60 students for Linear Algebra and Probability and Statistics is as below <table border="1"><tr><td></td><td>Probability and Statistics</td><td>Linear Algebra</td></tr><tr><td>Mean</td><td>80</td><td>50</td></tr><tr><td>S. D</td><td>15</td><td>10</td></tr></table> Coefficient of correlation $r = 0.4$. Estimate the marks of the students in Probability and Statistics who scored 60 marks in Linear Algebra.		Probability and Statistics	Linear Algebra	Mean	80	50	S. D	15	10	8					
	Probability and Statistics	Linear Algebra																
Mean	80	50																
S. D	15	10																

L3	210.3	e	Compute the equations of the line of regression to the following data $x: 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \quad 11$ $y: 11 \quad 14 \quad 14 \quad 15 \quad 12 \quad 17 \quad 16$	8
		Q.2	Attempt the following	20
L3	210.4	a	<p>The probability that a bomb dropped from a plane will hit the target is $1/5$. If six such bombs are dropped calculate the probability using binomial distribution that</p> <p>(i) Exactly two bombs hit the target</p> <p>(ii) At least two bombs will hit the target</p> <p style="text-align: center;">OR</p> <p>From a box containing 100 transistors 20 of which are defective, 10 are selected at random. Calculate the probability using binomial distribution that</p> <p>(i) All will be defective</p> <p>(ii) All are non-defective</p>	6
L3	210.4	b	<p>If the probability that an individual suffers a bad reaction from a certain injection is 0.001, calculate the probability that out of 2000 individuals</p> <p>(i) Exactly three will suffer</p> <p>(ii) More than two will suffer a bad reaction</p>	6
L3	210.4	c	<p>Weights of 4000 students are found to be normally distributed with mean 50 kgs and standard deviation 5 kgs. Calculate the number of students with weights</p> <p>(i) Less than 45 kgs</p> <p>(ii) Between 45 to 60 kgs</p> <p>(S. N. V. z area between $z = 0$ and $z = 1$ is 0.3413 and that between $z = 0$ and $z = 2$ is 0.4772)</p>	8
		Q.3	Attempt the following	20
L3	210.5	a	<p>Solve the homogeneous recurrence relation</p> $a_r - 7a_{r-1} + 10a_{r-2} = 0 \text{ with } a_0 = 1 \text{ and } a_1 = 2$	7

L3	210.5	b	Solve the non-homogeneous recurrence relation $a_r - a_{r-1} - 6 a_{r-2} = -30$ <p style="text-align: center;">OR</p> Solve the non-homogeneous recurrence relation $a_r - 9a_{r-1} + 20 a_{r-2} = 2r$	8																		
L3	210.5	c	Compute the characteristic equation and characteristic roots of recurrence relation $a_r - 7a_{r-1} + 12 a_{r-2} = 0$	5																		
		Q.4	Attempt the following	20																		
L3	210.3	a	Fit a straight line $y = a + bx$ to the following data $x:$ 1 2 3 4 5 6 $y:$ 49 54 60 73 80 86	6																		
L3	210.3	b	Fit a second-degree parabolic curve to the following data $x:$ 1 2 3 4 5 6 7 8 9 $y:$ 2 6 7 8 10 11 11 10 9 <p style="text-align: center;">OR</p> Fit a second-degree curve to the following data and estimate the production in 1982 <table style="margin-left: auto; margin-right: auto;"><tr><td><i>Year x</i></td><td>1974</td><td>1975</td><td>1976</td><td>1977</td><td>1978</td><td>1979</td><td>1980</td><td>1981</td></tr><tr><td>Production y</td><td>12</td><td>14</td><td>26</td><td>42</td><td>40</td><td>50</td><td>52</td><td>53</td></tr></table>	<i>Year x</i>	1974	1975	1976	1977	1978	1979	1980	1981	Production y	12	14	26	42	40	50	52	53	7
<i>Year x</i>	1974	1975	1976	1977	1978	1979	1980	1981														
Production y	12	14	26	42	40	50	52	53														
L3	210.3	c	Fit a curve of the form $y = a b^x$ to the following data $x:$ 1 2 3 4 5 6 7 8 $y:$ 1 1.2 1.8 2.5 3.6 4.7 6.6 9.1	7																		