

Enroll No.....

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No. of Pages: 03

B.Tech.

2022

Sem 2

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Department of Food & Technology (SIST)
Even Semester Examination-2022 (Backlog)

Paper Name: Mathematics-II

Paper Code: BFTC-201

Time: 3 Hours

Maximum Marks: 75

NOTE: Programmable calculator is not allowed.**Course Outcomes:**

After completing this Course, the students should be able to:

CO-1 Discuss the problems of basic Probability and probability distribution of discrete random variables.**CO-2** Describe the probability distribution of continuous random variables and apply to solve problems.**CO-3** Find Bivariate Distributions and distribution of some and quotients.**CO-4** Solve the problems on Measures of central tendency and some others probability distribution like, Binomial and Normal Distributions.**CO-5** Use the Application of Statistics like, Curve fitting and different sample test of single proportions.**PART -A****(All questions are compulsory)****(7 X 5 = 35)**

S. No	Questions	Marks	Course Outcomes	Blooms Taxonomy Level																		
Q.1	If X is poisson variate such that $P(1) = P(2)$. Find (i) Mean (ii) $P(X = 4)$, (iii) $P(X \geq 1)$.	5	CO4	L3																		
Q.2	Define Random Experiment, Event, Sample Space, Sample Point and Mutually Exclusive Event with suitable examples?	5	CO1	L1																		
Q.3	A speaks truth in 60% cases and B in 70% cases. In what percentage of cases are they likely to contradict each other in stating the same fact?	5	CO1	L2																		
Q.4	A random variable X has the following distribution <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></tr><tr><td>$f(x)$</td><td>k</td><td>2k</td><td>3k</td><td>4k</td><td>5k</td><td>6k</td><td>7k</td><td>8k</td></tr></table> Determine (i) k (ii) $E(x)$ (iii) $P(x \leq 2)$ (iv) $P(2 \leq x \leq 5)$.	x	1	2	3	4	5	6	7	8	$f(x)$	k	2k	3k	4k	5k	6k	7k	8k	5	CO2	L4
x	1	2	3	4	5	6	7	8														
$f(x)$	k	2k	3k	4k	5k	6k	7k	8k														

Q.5	What do you mean by Correlation? Calculate Karl Pearson's coefficient of correlation between x and y for the following distribution. (1,6), (2,5), (3,7), (4,9), (5,8), (6,10), (7,11), (8,13), (9,12).	5	CO4	L5														
Q.6	A businessman goes to hotel X, Y and Z, 20%, 50% and 30% of the times resp. it is known that 5%, 4%, and 8% of the rooms in X, Y, Z hotels have faulty plumbing. What is the probability that businessman's room having faulty plumbing is assigned to hotel Z?	5	CO3	L4														
Q.7	Fit a straight line to the following data: <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>8</td></tr><tr><td>y</td><td>2.4</td><td>3</td><td>3.6</td><td>4</td><td>5</td><td>6</td></tr></table>	x	1	2	3	4	6	8	y	2.4	3	3.6	4	5	6	5	CO5	L6
x	1	2	3	4	6	8												
y	2.4	3	3.6	4	5	6												

PART – B

(Attempt any Four Questions out of Six)

(4 X 10 = 40)

S. No	Questions	Marks	Course Outcomes	Blooms Taxonomy Level												
Q.1	Define Discrete and Continuous random variable with suitable Examples? The density function of a random variable X is $f(x) = \begin{cases} e^{-x} & \text{if } x > 0 \\ 0 & \text{otherwise} \end{cases}$ Find $E(X), E(X^2), Var(X)$ and S.D(X).	10	CO2	L5												
Q.2	For the following data: <table><tr><td>Mark s</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr><tr><td>No. of students</td><td>10</td><td>15</td><td>30</td><td>15</td><td>10</td></tr></table>	Mark s	0-10	10-20	20-30	30-40	40-50	No. of students	10	15	30	15	10	10	CO4	L3
Mark s	0-10	10-20	20-30	30-40	40-50											
No. of students	10	15	30	15	10											

	Find (i) first four moments (ii) standard deviation (iii) skewness and (iv) kurtosis.																			
Q.3	Define Regression analysis? Find the equations to the lines of regression for the given data. Also obtain an estimate value of y which should correspond to $x = 9$. <table border="1"><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></tr><tr><td>y</td><td>7</td><td>8</td><td>9</td><td>11</td><td>10</td><td>13</td><td>12</td></tr></table>	x	1	2	3	4	5	6	7	y	7	8	9	11	10	13	12	10	CO4	L4
x	1	2	3	4	5	6	7													
y	7	8	9	11	10	13	12													
Q.4	Define Null and Alternative Hypothesis? A coin is tossed 960 times and Head turned up 183 times. Is the coin unbiased? Level of significance is 3.	10	CO5	L2																
Q.5 (a)	A dice is thrown twice and the sum of the numbers appearing is observed to be 7. What is the conditional probability that the number 2 has appeared at least once?	10	CO1	L4																
(b)	A bag contains 4 white and 2 black balls. Another bag contains 3 white and 5 black balls. If one ball is drawn from each bag, find the probability that (i) both are white (ii) both are black (iii) one is white and one is black.																			
Q.6 (a)	Find $E[X]$ (Expectation of X) and $V[X]$ (Variance of X), where X is the outcome when we roll a fair die.	5	CO3	L1																
(b)	If X is a binomially distributed random variable with $E(X) = 2$ and $V(X) = \frac{4}{3}$, find the distribution of X .	5	CO4	L5																

BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3- Applying, 4- Analyzing, 5- Evaluating, 6- Creating)

CO-Course Outcomes

*****End of Paper*****