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School of Engineering Sciences & Technology
Even Semester Examination-2023

Paper Name: Mathematics-II

Paper Code: BTCSE 202/BTECE 202

Time: 2.5 Hours

Maximum Marks: 60

NOTE: Programmable calculator is not allowed.

PART -A

All questions are compulsory

(4 X 5 = 20)

S. No	Questions	Marks	CO	BL
Q.1	The distribution of the number of road accidents per day in a city is Poisson with mean 3. Find the number of days out of 1000 days when there will be (i) No accident (ii) At least 2 accidents.	5	CO4	L3
Q.2	The probability density function of a random variable X is $f(x) = \begin{cases} \frac{c}{1+x^2}, & \text{if } 0 \leq x \leq 1 \\ 0, & \text{Otherwise} \end{cases}$ Find c and $P(X \leq \frac{1}{\sqrt{3}})$.	5	CO2	L2
Q.3	There are three coins one is two-headed, other is biased coin that comes up 75 percentage time head and third is unbiased coin. One of the coin is chosen randomly and is tossed and it shows that head. What is the probability that it comes from two headed coin.	5	CO1	L4
	The Joint probability density function of two discrete random variable X and Y is $f(x,y) = \begin{cases} c(2x+y) & \text{where } x = 0,1,2 \text{ and } y = 0,1,2,3 \\ 0 & \text{otherwise} \end{cases}$ Then find the value of c and $P(X \geq 1, Y \leq 2)$.	5	CO3	L3

PART - B

Attempt any Four Questions out of Six

(4 X 10 = 40)

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S. No	Questions	Marks	CO	BL												
Q.1	Create a fit straight line for the following data by using least square method. Also determine the coefficient of correlation. <table><tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Y</td><td>3</td><td>5</td><td>7</td><td>8</td><td>9</td></tr></table>	X	1	2	3	4	5	Y	3	5	7	8	9	10	CO5	L6
X	1	2	3	4	5											
Y	3	5	7	8	9											

Q.2	Let X and Y be random variables having joint density function $f(x,y) = \begin{cases} \frac{1}{96}xy, & 0 \leq x \leq 4, 1 \leq y \leq 5 \\ 0 & \text{otherwise} \end{cases}$ Find (a) $E(X)$ (b) $E(Y)$ (c) $E(XY)$ (d) $Cov(X,Y)$	10	CO3	L3																
Q.3	Let X and Y be the two continuous random variables having joint probability density function $f(x,y) = \begin{cases} c(x^2 + y^2), & 0 \leq x \leq 1, 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$ Find (a) c (b) $P(X < \frac{1}{2}, Y > \frac{1}{2})$.	10	CO2	L3																
Q.4	In a random sample of 400 persons from a large population 120 are females. Can it be said that males and females are in the ratio of 5:3? Justify by using test hypothesis at 1% level of significance.	10	CO5	L4																
Q.5	A random variable X has the following probability distribution function <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>$P(X)$</td> <td>k</td> <td>$2k$</td> <td>$2k$</td> <td>$3k$</td> <td>k^2</td> <td>$2k^2$</td> <td>$7k^2 + k$</td> </tr> </table> Determine (i) k (ii) $P(2 \leq X \leq 5)$ (iii) $Var(X)$.	X	1	2	3	4	5	6	7	$P(X)$	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$	10	CO1	L5
X	1	2	3	4	5	6	7													
$P(X)$	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$													
Q.6	(a) FindTT The Saving bank account of a customers should have an average balance is 150 dollars and standard deviation is 50 dollars. Assuming that account balance are normally distributed. Find what percentage of account is between 120 and 170 dollars balance. Given that $P(z \leq 0.4) = 0.6554$ and $P(z < -0.6) = 0.2743$ (b) Out of 600 family with 3 children each. How many would you expect (i) 2 boy (ii) one boy	5 5	CO4	L4																

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

CO-Course Outcomes

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