

JAMIA HAMDARD
Department of Computer Science & Engineering
School of Engineering Sciences & Technology
Even Semester Supplementary Examination-2023

Paper Name: Mathematics-II

Paper Code: BTCSE-202

Time: 3 Hours

Maximum Marks: 75

NOTE: Programmable calculator is not allowed.

PART -A

(All questions are compulsory)

(7 X 5 = 35)

S. No	Questions	Marks	CO	BL
Q.1	If X is poisson variate such that $\frac{3}{2}P(X = 1) = P(X = 3)$. Find (i) $P(X \geq 1)$, (ii) $P(X \leq 3)$.	5	CO1	L3
Q.2	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	L4
Q.3	Three Students A, B and C appeared in an entrance examination. Their chance of qualifying the examination are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. Find the Probability that (i) None of them will qualify (ii) At least one of them will qualify	5	CO1	L2
Q.4	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	L6
Q.5	The Joint probability density function of two continuous random variable $f(x, y) = \begin{cases} cxy, & 0 < x < 4 \text{ and } 1 < y < 5 \\ 0 & \text{otherwise} \end{cases}$ Then find the value of c and $P(X \geq 3, Y \leq 2)$.	5	CO3	L3
Q.6	The probability density function of a random variable X is $f(x) = \begin{cases} e^{-x} & \text{if } x > 0 \\ 0 & \text{otherwise} \end{cases}$ Find $E(X)$, $E(X^2)$ and $var(X)$.	5	CO2	L4
Q.7	Out of 600 family with 3 children each. How many would you expect (i) 2 boys (ii) At least one boy	5	CO4	L3

PART – B

(Attempt any Four Questions out of Six)

(4 X 10 = 40)

S. No	Questions	Marks	CO	BL																		
Q.1	Fit a straight line of the form $Y = a + bX$ for the following data: <table><tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Y</td><td>1</td><td>5</td><td>10</td><td>22</td><td>38</td></tr></table>	X	0	1	2	3	4	Y	1	5	10	22	38	10	CO5	L5						
X	0	1	2	3	4																	
Y	1	5	10	22	38																	
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 stude nts</td><td>10</td><td>15</td><td>30</td><td>15</td><td>10</td></tr></table> Find (i) first four moments (ii) standard deviation (iii) skewness and (iv) kurtosis.	Mark s	0-10	10-20	20-30	30-40	40-50	No. of stude nts	10	15	30	15	10	10	CO4	L3						
Mark s	0-10	10-20	20-30	30-40	40-50																	
No. of stude nts	10	15	30	15	10																	
Q.3	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.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	L2																		
Q.5	A random variable X has the following probability distribution function <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>$P(X)$</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) $E(X^2)$ (iv) $var(X)$ (v) $P(2 \leq X \leq 5)$.	X	1	2	3	4	5	6	7	8	$P(X)$	k	2k	3k	4k	5k	6k	7k	8k	10	CO1	L5
X	1	2	3	4	5	6	7	8														
$P(X)$	k	2k	3k	4k	5k	6k	7k	8k														
Q.6 (a)	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 $P(z < -0.6) = 0.2743$	5	CO4	L6																		
(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	L3																		

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

CO-Course Outcomes

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