Sub Code: CS/IS/CY/CI 41	Sub: Statistics, Probability and Linear Programming	Test:	I
Semester: IV	Term: 15.04.2024 TO 27.07.2024	Marks:	30
Date: 30.05.2024	Time: 02.00 PM – 03.00 PM	Sections:	CSE stream

Note: Answer any TWO full questions. Each main question carries 15 marks

Q. No.		Questions	Blooms Level	CO's	Marks
1.	(a)	Write the normal equations to fit the curve of the form $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2$ using the method of least squares for the given data.	L1	CO1	2
	(b)	The probability that a man aged 60 will live up to 70 is 0.65. What is the probability that out of 10 men, now aged 60, at least 7 will live up to 70	L2	CO1	3
	(c)	In some determinations of the volume V of Carbon dioxide dissolved in a given volume of water at different temperatures θ the following pairs of values were obtained. Find a relation of the form $V = a + b\theta$ which best fits to these observations.	L3	CO1	5
	(d)	The joint distribution of two variables X and Y are given below	L4	CO2	5

θ	0	5	10	15
V	1.80	1.45	1.18	1.00

X \ Y	-4	2	7
1	1/8	1/4	1/8
5	1/4	1/8	1/8

Find (i) Marginal distributions of X and Y (ii) $E(X)$ (iii) $E(Y)$ (iv) $E(XY)$

(a)	Write the expression of mean and variance of Uniform distribution	L1	CO2	2
(b)	In a partially destroyed laboratory record, only the line of regression of y on x and x on y are available as $4x - 5y + 33 = 0$ and $20x - 9y = 107$ respectively. Calculate $\bar{x}, \bar{y}$ and the coefficient correlation between x and y.	L2	CO1	3
(c)	The sales per day in a shop are exponentially distributed with average sale amounting to Rs.100 and net profit is 8%. Find the probability that the net profit exceeds Rs.30 on any given day.	L3	CO2	5
(d)	A communication channel receives independent pulses at the rate of 12 pulses per micro second. The probability of transmission error is 0.001 for each micro second. Compute the probability of (i) no error during a micro second (ii) one error per micro second (iii) at least one error per micro second. (iv) two errors using Poisson distribution.	L4	CO1	5

3.	(a)	Write normal equations to fit a parabola of the form $y = ax^2 + bx$, by the method of least squares.	L1	CO1	2
	(b)	Find k and $E(X)$ for the probability function $P(X)$ defined by the following table X: 1 | 2 | 3 | ..... | n $P(X)$: k | 2k | 3k | ..... | nk Where k is an appropriate constant.	L2	CO1	3
	(c)	The no. of accidents per day on a certain highway is a gamma variate with an average 6 and variance 18. Find the probability that there will be (i) more than 8 accidents (ii) Between 5 and 8 accidents.	L3	CO2	5
	(d)	In a normal distribution (Gaussian random variable), 7% are under 35 and 89% are under 63. Find the mean and the standard deviation, given that A(1.23) = 0.39 and A(1.48) = 0.43.	L5	CO2	5