

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 2 EXAMINATION (October 2025)

B.Tech. - III Semester (CSE/IT)

COURSE CODE (CREDITS): 18B11MA313 (3)

MAX. MARKS: 25

COURSE NAME: PROBABILITY & STATISTICS

COURSE INSTRUCTORS: RKB*

MAX. TIME: 1 Hr 30 Mins

Note: All questions are compulsory. The candidate is allowed to make suitable numerical assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	The probability that Ravi does his homework is $1/10$ if he goes out with his friends and $3/5$ if he does not go out with his friends. The probability that Ravi goes out with his friends is $3/4$. What is the probability that Ravi does his homework?	CO-1	4
Q2	In a manufacturing unit, machines X, Y and Z manufacture respectively 20%, 35% and 45% of the total. Of their output, 5%, 4%, 2% are defective products. A product is drawn at random from the products and is found to be defective. What are the probabilities that it was manufactured by machines X, Y and Z?	CO-2	4
Q3	A coin has a probability of 0.6 of showing heads. The coin is tossed four times. Let X denote the number of heads obtained. Determine the probability mass function (p.m.f) of X and find $P(X \geq 2)$.	CO-3	4
Q4	The probability density function (p.d.f.) of a continuous random variable X is given by $f(x) = \begin{cases} kx^2, & 0 \leq x < 2 \\ k(4-x), & 2 \leq x \leq 4 \\ 0, & \text{otherwise} \end{cases}$. (a) Find the value of k. (b) Determine the cumulative distribution function (c.d.f.) F(x).	CO-3	4
Q5	Suppose that the two tasks A and B run on the same server. Let X and Y be their normalized execution times having the joint pdf $f(x,y) = 8xy$, for $0 < x < y < 1$. Compute the probability that both tasks finish before the hard deadline at time 1; i.e., compute $P(X + Y < 1)$.	CO-3	4
Q6	Show that X and Y are independent given their joint density function as $f(x,y) = \begin{cases} 6x, & 0 < x < 1, \quad 0 < y < 1-x \\ 0, & \text{otherwise} \end{cases}$ Find $P(X > 0.3 Y = 0.5)$.	CO-3	5
