JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B. Tech.-III Semester (IT-Backlog)

COURSE CODE (CREDITS): 18B11MA313 (3)　　　　　　　MAX. MARKS: 15

COURSE NAME: PROBABILITY AND STATISTICS

COURSE INSTRUCTOR: SST　　　　　　　　　　　　　　MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems

(c) Use of calculators is not allowed

Q. No.	Question	CO	Marks
Q1	Two events A and B have the following probabilities: $P[A] = 1/4$, $P[B\|A] = 1/2$, and $P[A\|B] = 1/3$. Compute: a) $P[A \cap B]$ b) $P[B]$ c) $P[A \cup B]$.	1	3
Q2	A group of students consists of 60% men and 40% women. Among the men, 30% are foreign students, and among the women, 20% are foreign students, A student is randomly selected from the group and found to be a foreign student. What is the probability that the student is a woman?	1	3
Q3	Ken was watching some people play poker, and he wanted to model the PMF of the random variable N that denotes the number of plays up to and including the play in which his friend Joe won a game. He conjectured that if p is the probability that Joe wins any game and the games are independent, then the PMF of N is given by. $p_N(n) = p, n = 1,2,3, \dots$ Show that $p_N(n)$ is a legitimate PMF.	2	3
Q4	Three vans were used to carry 45 students in the applied probability class to participate in a state competition on random phenomena. The first van carried 12 students, the second van carried 15 students, and the third van carried 18 students. Upon their arriving at the competition, one student was randomly selected from the entire group to receive a gift certificate for a free lunch at a local restaurant. What is the expected number of students in the van that carried the selected student?	2	3
Q5	Find the mean and variance of the discrete random variable X with the following PMF: $p_X(x) = \begin{cases} \frac{2}{5}, x = 3 \\ \frac{3}{5}, x = 6 \end{cases}$.	2	3