JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-VII Semester (CSE/IT)

COURSE CODE (CREDITS): 18B1WCI742 (3)

MAX. MARKS: 35

COURSE NAME: Artificial Intelligence

COURSE INSTRUCTORS: HRI/ KTS/ SRJ   MAX. TIME: 2 Hours

Note: (a) *All questions are compulsory. Use of scientific calculator is allowed.*
          (b) *The candidate is allowed to make Suitable numeric assumptions wherever required*
          for solving problems

Q.No	Question	CO	Marks
Q1	A man needs to transport a lion, a goat, and a cabbage across a river. He has a boat in which he can take only one of them at a time. It is only his presence that prevents the lion from eating a goat, and from the goat eating the cabbage. He cannot leave the goat alone with the lion, nor the cabbage with the goat. How can he take all across the river? Draw a state space representation to solve the problem.	[CO1]	[5]
Q2	Explain the following in ACO with proper meaning of symbols: (a) Probability of kth ant moving from city i to j. (b) If the pheromone level on an edge is $\tau = 0.5$, heuristic value $\eta = 4$, $\alpha = 1$, $\beta = 2$, and the sum of probabilities = 10, calculate the probability of choosing that edge.	[CO2]	[5]
Q3	Describe various rules of inference in Logic.	[CO3]	[4]
Q4	Consider the following statements are true in a given knowledge base in Propositional Logic. Alice likes mathematics and she likes stories. If she likes mathematics and she likes algebra. If she likes algebra and likes physics she will go to college. She does not like stories or she likes physics. She does not like chemistry and history. Is the statement true/false "Alice will go to college"? Prove.	[CO3]	[3]
Q5	Describe Naïve-bayes assumptions and rules when multiple evidences are seen.	[CO4]	[3]
Q6	For a certain plat come from three different cities A, B and C where 30% are from A, 25% are from B and 45% are from C. Out of those 2% from A, 1% from B and 3% from C are found COVID positive. Find the probability that a worker chosen at random would be tested COVID positive and also find the probability that if a worker is tested COVID positive, what is the probability that he is coming from A or B or C?	[CO4]	[4]
Q7	Given X=[1,2,3,4], and Y=[1.5, 2, 2.5, 5]. If we start with b=0.5 and w=0.5, compute b and w after the first iteration if the learning rate is 0.23.	[CO5]	[5]
Q8	Describe the impact of bias and variance on underfit and overfit of a linear regression model. How can a generalized model be obtained?	[CO5]	[6]