

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination, December 2022
B. Tech. (CSE), Semester V, 2022-23

Roll No.....

CS1110: AI AND MACHINE LEARNING

Time: 3 hours

Max. Marks: 60

Instructions to students:

1. Do not write anything other than your roll number on the Question Paper.
 2. Mention all the assumptions for your answers clearly.
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Q1. Given the following current state of the Tic Tac Toe problem, show clearly the next best move for X, using the Min Max algorithm with alpha pruning. (LO2) (10)

(b b b b X b O b)

Q2. The initial and final states in an 8-puzzle are given below. (LO3) (2+8)

Initial state: (1 2 b 3 5 4 7 6 8)

Final state: (1 2 3 4 b 5 6 7 8)

- a. Is the puzzle solvable? Give reasons for your answer.
- b. Show clearly the next 3 best moves, using a suitable local or global heuristic.

Q3a. For the Traveling Salesman Problem given below as a matrix, find the shortest distance between A and E, using both the Nearest Neighbour and Branch and Bound Algorithms. (LO3) (2+5)

	A	B	C	D	E
A	-	3	5	6	2
B	3	-	6	9	4
C	5	6	-	8	7
D	6	9	8	-	1
E	2	4	7	1	-

Q3b. In the Water Jug problem, what is minimum number of steps in which we can measure exactly 5 litres, given a 7-litre and a 3-litre jug? Show the steps. (LO3) (3)

Q4a. Compare and contrast, in tabular form, Linear and Logistic Regression. (LO4) (5)

Q4b. Discuss clearly, using neat diagrams, the role of the Gradient Descent algorithm in minimizing the Cost Function in Linear Regression. (LO6) (5)

Q5a. How does the backpropagation algorithm help in ANN based learning? Explain using a neat diagram. (LO5) (5)

Q5b. Show clearly how a Perceptron can implement a NAND function. (LO5) (5)

Q6a. Find the value of the cost function J , after the first iteration, given the following data set and assuming $\theta_0 = 1$ and $\theta_1 = 1.5$, and $h(\theta) = \theta_0 + \theta_1 x$. (LO6) (5)

x	y
2	3
4	10
6	4
8	13

Q6b. In classification, what is the role of the Confusion matrix? Explain clearly using a neat diagram. (LO6) (5)