



**School of Computer Science and Engineering**

Winter Semester 2023-24

Continuous Assessment Test – 2

**SLOT: B1+TB1**

**Programme Name & Branch : B.Tech Computer Science and Engineering**

**Course Name & code: ARTIFICIAL INTELLIGENCE - BCSE306L**

**Class Number (s): Common to all batches**

**Exam Duration: 90 Min.**

**Maximum Marks: 50**

Q. No	Question	Max Marks
1.	<p>Consider the game tree given below. By Applying mini-max search, show the backed-up values in the tree. If the nodes are expanded from left to right, what nodes would not be visited using alpha-beta pruning?</p>	10
2.	<p>Consider the following story of the "lucky student":</p> <p>"Anyone passing his history exams and winning the lottery is happy. But anyone who studies or is lucky can pass all his exams. John did not study but he is lucky. Anyone who is lucky wins the lottery. Prove using resolution that "John Is happy"</p>	10
3	<p>(a) Convert the following English Statements into FOL ( 4 Marks)</p> <p>i) ) Any house in Parson costs less than any apartment in Chennai.            ii) Any small apartment costs less than any big house.            iii) There is exactly one house in Parson whose cost is Rs 20,00,000.            iv) There is a house in Parson which costs more than any other house.</p> <p>(b) Which of the following are entailed by the given sentence <math>(A \vee B) \wedge (\neg C \vee \neg D \vee E)</math>? Justify with suitable rules/laws ( 2 Marks)</p> <p>i.) <math>(A \vee B \vee C) \wedge (B \wedge C \wedge D \Rightarrow E)</math>            ii.) <math>(A \vee B) \wedge (\neg D \vee E)</math></p>	10

(c) Prove that the following statement is valid using laws of inference (4 Marks)

$$(A \rightarrow (B \rightarrow C)) \rightarrow ((A \rightarrow B) \rightarrow (A \rightarrow C))$$

4. (a) Three chests are presented to you. One contains treasure map, the other two are empty. Each box has imprinted on it a clue as to its contents; the clues are: (5 Marks)  
 Chest 1 "The treasure map is not here"  
 Chest 2 "The treasure map is not here"  
 Chest 3 "The treasure map is in Chest 2"  
 Only one message is true; the other two are false. Which box has the treasure map?  
 Formalize the puzzle in Propositional Logic and find the solution using a truth table.

(b) Using the probability values given in the table answer the following statements with proper justifications (5 Marks)

- Does the probability of wind increase given the probability of rain?
- What is the dependency between wind and Headache? Does the probability of wind remain unchanged given headache?
- Is rain conditionally independent of Headache, given wind?

P(rain ∧ wind ∧ Headache)	rain		¬rain	
	wind	¬wind	wind	¬wind
Headache	0.432	0.16	0.084	0.008
¬Headache	0.048	0.16	0.036	0.072

5. Apply Naïve Bayes Classification for the given dataset of animals along with their attributes.

Give Birth	Can Fly	Live In Water	Have Legs	Class
yes	no	no	yes	mammals ✓
no	no	no	no	non-mammals
no	no	yes	no	non-mammals
yes	no	yes	no	mammals ✓
no	no	sometimes	yes	non-mammals
no	no	no	yes	non-mammals
yes	yes	no	yes	mammals ✓
no	yes	no	yes	non-mammals
yes	no	no	yes	mammals ✓
yes	no	yes	no	non-mammals
no	no	sometimes	yes	non-mammals
no	no	sometimes	yes	non-mammals
yes	no	no	yes	mammals ✓
no	no	yes	no	non-mammals
no	no	sometimes	yes	non-mammals
no	no	no	yes	non-mammals
no	no	no	yes	mammals ✓
no	yes	no	yes	non-mammals
yes	no	yes	no	mammals ✓
no	yes	no	yes	non-mammals

Execute the following query to predict the class

Give Birth	Can Fly	Live in Water	Have Legs	Class
yes	no	yes	no	?