



VIT

Vellore Institute of Technology
(Approved by the University under section 3 of UGC Act, 1956)

REG.NO.:

SLOT: B1+TB1

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2026-2027

Session: I/II/III/IV

Programme Name & Branch : B.Tech., [Artificial Intelligence and Cyber Security]
Course Code and Course Name : BCSE306L & Artificial Intelligence
Faculty Name(s) : Prof. JAYALAKSHMI P, Prof.SIVASHANKARI R,
Prof. BENJULA ANBU MALAR M B
Class Number(s) : VL2026270102516, VL2026270102518,
VL2026270102522
Date of Examination : 28/09/26
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
 - M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- CO2: Apply basic principles Of AI in solutions that require problem-solving, inference, perception, knowledge representation and learning
CO4: Analyze and illustrate how search algorithms play a vital role in problem-solving.

Q. No	Question	M	CO	BL												
1.	A factory robot must arrange four components W, X, Y, and Z into the required layer before assembly. <table><tr><td>Initial State</td><td>Goal state</td></tr><tr><td>X</td><td>W</td></tr><tr><td>Z</td><td>X</td></tr><tr><td>W</td><td>Y</td></tr><tr><td>Y</td><td>Z</td></tr><tr><td>Floor</td><td>Floor</td></tr></table> The Robot moves one clear component at a time. Local heuristic: +1 for each block that is resting on the thing it is supposed to be resting on. _1 for each block that is resting on a wrong thing. Global heuristic: For each block that has the correct support structures: +1 to every block in the support structure. For each block that has a wrong support structure: -1 to every block in the support structures. Identify what is the state used after local heuristic. How do you solve the problem by using global heuristic in Hill Climbing algorithm? Show and explain the step-by-step process.	Initial State	Goal state	X	W	Z	X	W	Y	Y	Z	Floor	Floor	10	CO2	BL4
Initial State	Goal state															
X	W															
Z	X															
W	Y															
Y	Z															
Floor	Floor															
2.	Consider a two-player turn-based strategy game where each player tries to maximize or minimize the game score at the end of the game. The game tree is given below	10	CO2	BL3												

[1]



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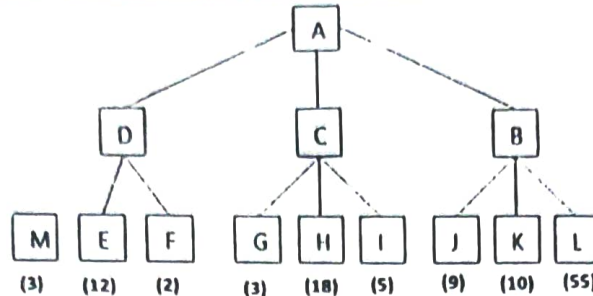
Vellore Institute of Technology
At Kotturamballi, Vellore, Tamil Nadu - 620 015, India

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- Apply the Minimax Algorithm to determine the optimal move for the Maximiser at the start node. Show all calculations for each node. (4 marks)
- Apply Alpha-Beta Pruning to the same game tree and show how it reduces the number of node evaluations. Explain which nodes were pruned and why? (6 marks)

3.

- Convert the following English statements into First Order Logic (FOL)
 - Any house in Vellore costs less than any apartment in Katpadi.
 - Any 3 star washing machine costs less but consume more power than a 5-star washing machine.
 - There is exactly one person whose JEE rank is 14.
 - There is a villa in Chennai which comes more than any other villa.
 - A person who loves his mother is loved by everyone.

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CO4

BL5

- Convert the given sentences into Propositional Logic.
 - It is not true that both the car is red and the sky is blue, but it is true that the car is either green or blue.
 - If the student studies, then the student will pass, but the student will pass only if the student attends the examination.
 - If the temperature is above 35°C, then we will use the air conditioner, and we will use the air conditioner only if electricity is available.
 - It is not true that both the internet connection is unavailable and the server is working.
 - Either I will go to the party if and only if I finish my work, or I will not go to the party if and only if I do not finish my work.

5

CO4

BL3

- In a hospital, doctors follow these rules: if a patient has either a fever or a cough, then the patient is considered to have an infection. If a patient has an infection, then antibiotics are prescribed. Additionally, if the patient has a fever, they are also sent for a blood test. Now, suppose a patient has a cough but no fever.
 - Apply both the forward and backward chaining, determine whether the patient will be prescribed antibiotics.

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- Prove by using inference rule in First Order Logic for the above scenario.

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[2]



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5.	Convert these sentences to First-Order Logic. Using proof by refutation and resolution as the single inference rule, show the resolution graph that proves the goal. Every animal that is hungry needs food. Every animal that needs food searches for food. Every dog is an animal. Bruno is a dog. Bruno is hungry. Conclusion: Does Bruno search for food?	10	CO4	BL5
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[3]