REG.NO.:

SLOT: D2+TD2

VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

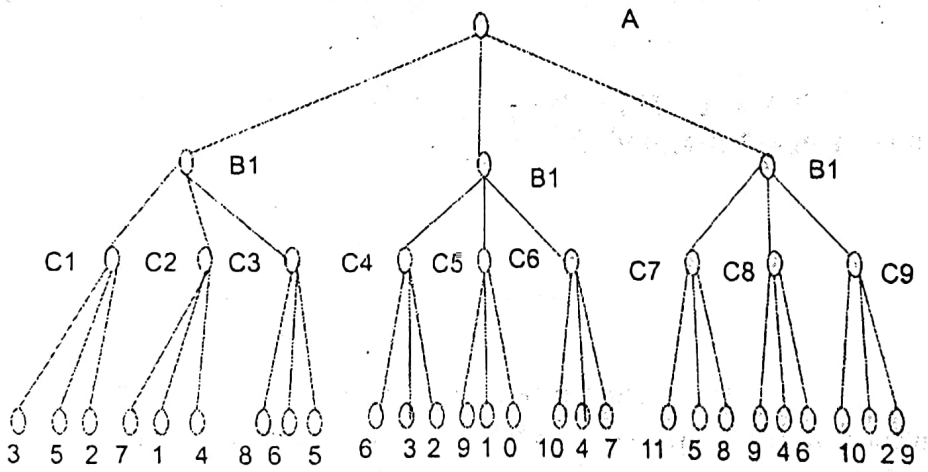
SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2025-2026

Programme Name & Branch	: B.Tech (CSE)
Course Code and Course Name	: BCSE306L and Artificial Intelligence
Faculty Name(s)	: Common to all
Class Number(s)	: Common to all
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)
- Course Outcomes: (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)
  CO4-Analyse and illustrate how search algorithms play a vital role in problem-solving

Q. No	Question	M	CO	BL
1.	Consider the game tree given below  a) Apply the Minimax Algorithm to calculate the Min Max value for each node and display in graph with a neat diagram. (3 Marks) b) Apply Alpha-Beta Pruning to prune the nodes that do not change the outcome of the game. (7 Marks)	10	4	3
2. A	Consider the following story of the "hardworking student": "Anyone who writes the thesis and passes the viva graduates.			

	But anyone who is hardworking or has a guide writes the thesis. If someone has a guide they get support. Anyone who gets support passes the viva. Alice is not hardworking but she has a guide. Prove using resolution that Alice graduates." (6 Marks)	10	4	4
2. B	Convert the following English Statements into FOL (4 Marks) i) Any smartphone cheaper than every laptop is a budget phone. ii) For every city there exists a hospital that is open 24 hours. iii) Every student enrolled in a course has a professor. iv) If a person is a doctor, then that person has treated at least one patient.			
3. A	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. Using propositional logic and applying both forward and backward chaining; determine whether the patient will be prescribed antibiotics. (6 Marks)			
3. B	Given the knowledge base. Prove the given using Inference Rules in Propositional Logic (4 Marks) i)KB: 1. $M \rightarrow N$ 2. $N \rightarrow O$ 3. M 4. $P \vee O$ 5. $\neg P$ Prove $N \wedge O$.	10	4	3

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	ii) KB: 1. $P \vee Q$ 2. $P \rightarrow R$ 3. $Q \rightarrow S$ 4. $R \rightarrow T$ 5. $S \rightarrow T$ Prove T.			
4. A	An AI-based medical assistant uses Bayes' theorem to diagnose flu (F) given symptoms fever (V) and cough (C). Given: $P(F) = 0.05$ $P(V\|F) = 0.9$, $P(C\|F) = 0.8$ $P(V\|\neg F) = 0.1$, $P(C\|\neg F) = 0.2$ Assume V and C are conditionally independent given F. If a patient shows both symptoms, compute $P(F \mid V \wedge C)$. (5 Marks)	10	3	3
4. B	Use the Naïve Bayes classifier for the dataset below. Compute the required conditional probabilities and predict the class of the new instance (P=0, Q=1, R=0) (5 Marks)			

Record	P	Q	R	Class
1	0	0	0	+
2	0	0	1	-
3	0	1	1	-
4	0	1	1	-
5	0	0	1	+
6	1	0	1	+
7	1	0	1	-
8	1	0	1	-
9	1	1	1	+
10	1	0	1	+

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5	For the Bayesian network given below: An office is monitored with five binary variables: Employee presence (E): Employees are present 20% of the time. Delivery person (D): Deliveries occur 5% of the time. Lights (L): If employee present → Lights on 95% of the time. If only delivery person present → Lights on 80% of the time. If no one present → Lights on 5% of the time. Window (W): With delivery → Window breaks 12% of the time. Without delivery → Window breaks 1% of the time. Alarm (A): Window broken & lights on → Alarm 99% chance. Window broken & lights off → Alarm 85% chance. Window intact & lights on → Alarm 2% chance. Window intact & lights off → Alarm 0.1% chance. Compute: a) An employee is present, no delivery occurs, lights are on, window intact, and alarm not triggered. What is the probability of this situation? b) No one is present, lights are off, window intact, and alarm not triggered. What is the probability of this situation?	10	3	4

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