Y/K/TY

Reg. No: [redacted]

VIT
Vellore Institute of Technology

Final Assessment Test – November 2025

Course: **BCSE306L - Artificial Intelligence**

Class NBR(s): **1437/2214/2220/2222/2225/2228/2234/2238/2243/2246/2266/2271/2274/2287/2310/2312/2314/2317/2318/2322**

Slot: **D1+TD1**

Time: **Three Hours**

Max. Marks: **100**

- **KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE**
- **DON'T WRITE ANYTHING ON THE QUESTION PAPER**

COs	CO Statements
CO1	Evaluate Artificial Intelligence (AI) methods and describe their foundations.
CO2	Analyse and illustrate how search algorithms play a vital role in problem-solving.
CO3	Demonstrate knowledge of reasoning, uncertainty, and knowledge representation for solving real-world problems.
CO4	Apply basic principles of AI in solutions that require problem-solving, inference, perception, knowledge representation and learning.
CO5	Illustrate the construction of learning and expert system.
CO6	Discuss current scope and limitations of AI and social Implications.

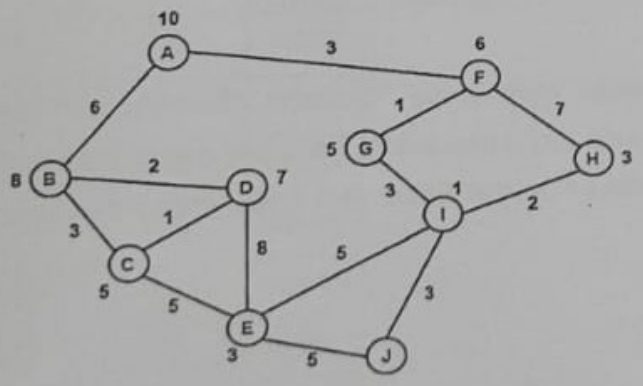
BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Answer ALL Questions

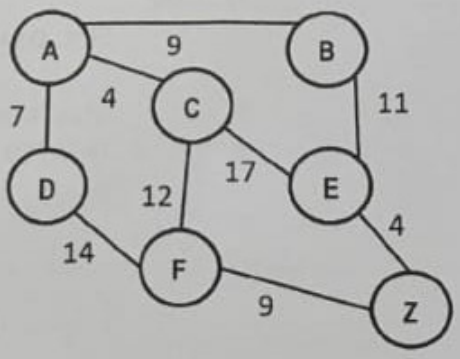
(10 X 10 = 100 Marks)

1. Consider an AI-powered healthcare assistant to help doctors and nurses in an hospital. The assistant should be able to: **CO1 BL4**
   -Monitor patients' vital signs using sensors.
   -Analyze medical records and suggest possible diagnoses.
   -Communicate with patients in natural language.
   -Coordinate with other hospital systems (e.g., pharmacy, scheduling).
   For the given scenario explain briefly the subfields of AI which could be integrated to create the healthcare assistant. Describe the PEAS and the various environment properties in which the bot operates.

2. Apply the following uninformed search algorithms on the given graph with **Start node: A and Goal node: J.** List the order of traversal and compare its path cost. **CO2 BL2**
   Depth First Search, Iterative Deepening Depth First Search and Uniform Cost Search.

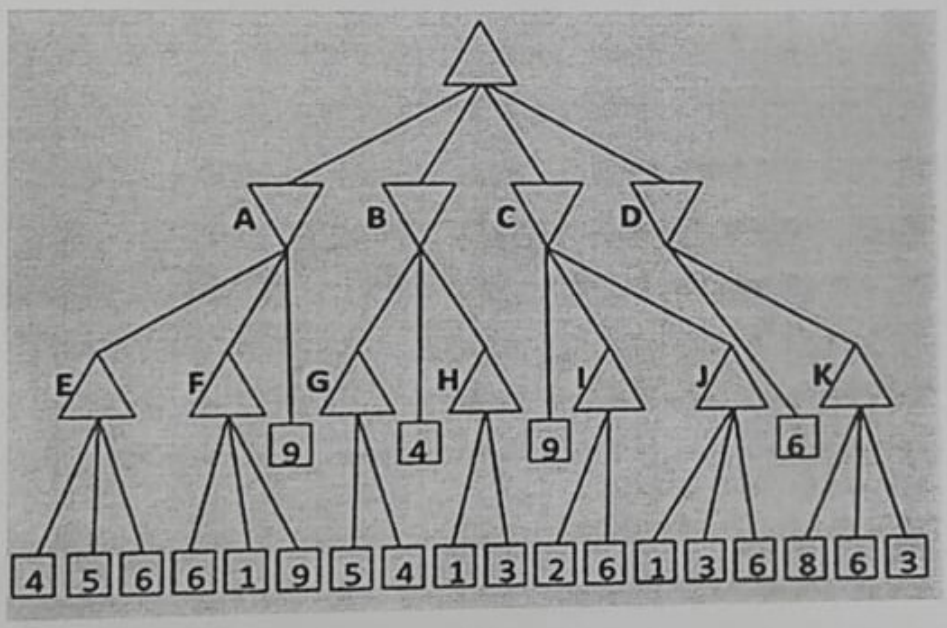


3. Apply Greedy Best First Search and A* search algorithm on the following graph with Start node: A and Goal node: Z. Compare the performance of the algorithms. CO4 BL2



Node	h(n)
A	21
B	14
C	18
D	18
E	5
F	8

4. CO4 BL3



Apply Min-max algorithm to compute the value propagated to the root node and Alpha–Beta Pruning to the same tree (left-to-right expansion) to indicate which branches are pruned.

5. CO4 BL3

a) Prove that the following premises build up a valid argument using the rule of inference.

"If today is Monday, I have an exam in Artificial Intelligence or Calculus. If my Artificial Intelligence Professor is absent, then I will not have a test in Artificial Intelligence. Today is Monday and my Artificial Intelligence Professor is absent. Therefore I have a test in Calculus."

b) From the given knowledge base prove "Curiosity killed the cat" using Forward chaining technique Jack owns a dog. Every dog owner is an animal lover. No animal lover kills an animal. Either Jack or Curiosity killed the cat, who is named Tuna.

6. Consider the following predicates and solve using resolution, Predicates: CO4 BL3

- Reads(x, b): person x reads book b
- Wrote(a, b): author a wrote book b
- Admires(x, y): x admires y
- Author(a), Person(p), InfluencedBy(x, y)

Knowledge base (English → FOL):

1. Anyone who reads a book written by someone admires that writer.
2. All authors are persons.
3. Anyone who admires a person is influenced by that person.
4. Alice is an author.
5. Alice wrote Book1.
6. John reads Book1.

Goal: Using resolution prove that **InfluencedBy(John, Alice).**

7. a) What is meant by uncertainty in decision-making? Why is Bayes' Theorem essential for handling uncertainty, and how does it help in reasoning under incomplete or probabilistic information? Illustrate with an example. [5] CO3 BL3

b) A company recruits from three colleges C1, C2, C3 with proportions: [5]

P(C1)=0.50, P(C2)=0.30, P(C3)=0.20.

Let T be the event "applicant passes the skills test".

Conditional pass rates: P(T|C1)=0.90, P(T|C2)=0.70, P(T|C3)=0.40.

i. Using the law of total probability, find P(T).

ii. Using Bayes' Theorem, find P(C2 | T).

8. Using the dataset given, classify the following input into accept /reject using Bayes' classifier. CO3 BL3

X=(age <40, cibil = normal, Employed=yes)

No.	Age	Cibil	Employed	Loan
1	<40	Good	Yes	accept
2	>40	Good	Yes	reject
3	=40	Normal	yes	reject
4	<40	Bad	yes	reject
5	<40	Normal	No	accept
6	>40	Good	No	reject
7	>40	Bad	No	reject
8	=40	Normal	Yes	reject
9	<40	Bad	Yes	reject-
10	<40	Bad	No	accept
11	=40	Good	No	accept
12	>40	good	Yes	reject

9.a)	Give the STRIPS representation for Blocks world problem: Initial state: B is on A, A is on the table, D is on C, C is on table Goal: C is on A, A is on B. Give a partial order plan for the above problem.	CO5	BL2
	OR		
9.b)	With suitable STRIPS representation for states and actions, Give a hierarchical task consistent plan for an agent who is planning a vacation in London.	CO5	BL2
10.a)	Explain the steps in information retrieval. Explain the rank evaluation method used for web based retrieval using suitable examples.	CO6	BL3
	OR		
10.b)	Explain in detail any one object recognition methods which you are familiar with suitable diagrams and examples.	CO6	BL3

⇔⇔⇔ **Y/K/TY** ⇔⇔⇔