



**Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025**

**Artificial Intelligence**

Max. Marks: 100

*Note:* 1. Answer any **FIVE** full questions, choosing **ONE** full question from each module.  
 2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1				M	L	C
Q.1	a.	Define the term Artificial Intelligence. Describe the four categories of artificial intelligence.		10	L1	CO2
	b.	For each of the following agents, develop a PEAS description of the task environment. i) Robot soccer player ii) Internet book-shopping agent iii) Autonomous mars rover.		10	L1	CO2

**OR**

Q.2	a.	Explain the agents interact with environments through sensors and actuators with an example.		10	L2	CO1
	b.	For each of the following agents, characteristics the environment according to the properties. i. Robot soccer player ii. Internet book-shopping agent iii. Autonomous mars rover.		10	L3	CO1

**Module – 2**

Q.3	a.	Illustrate the components of well-defined problems by formulating “Vacuum world” toy problem.		10	L2	CO2
	b.	Compare/Tabulate the uninformed search strategies such as breadth first, uniform cost, depth first and depth limited in terms of complete, time, space and optimal criteria.		10	L2	CO

**OR**

Q.4	a.	Explain simple-problem-solving-agent with an algorithm. Also state the assumptions done in the process of agent design.		10	L2	CO2
	b.	Discuss Breadth-First Search (BFS) strategy and choose evaluation criteria, describe the BFS.		10	L3	CO3

## Module – 3

Q.5 a. The road map and heuristic values are given in the Fig.Q5(a).

12 L3 CO2

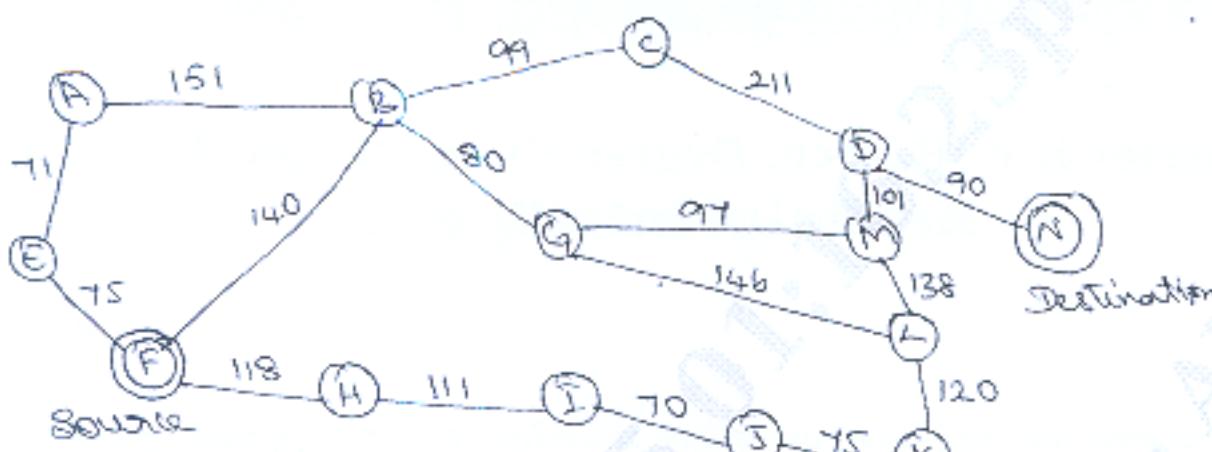


Fig.Q5(a)

Values of  $h$ (heuristic)

A	366	B	253
C	176	D	0
E	374	F	366
G	193	H	329
I	244	J	241
K	242	L	160
M	100	N	77

Explain A\* search and show the stages (atleast 5 to 6 stages).

b. Describe explain the knowledge-based agent.

8 L3 CO3

OR

Q.6 a. Explain Wumpus World with PEAS description.

5 L2 CO3

b. Illustrate the BNF grammar of sentences in proposition logics, along with operator precedences, form highest to lowest.

10 L2 CO3

c. Explain reasoning patterns in propositional logic.

5 L2 CO3

## Module – 4

Q.7 a. List and explain the steps involved in knowledge engineering process in first order logic.

10 L2 CO4

b. Write the syntax of first-order logic in BNF and explain it.

10 L2 CO4

OR

Q.8 a. Write the unification algorithm and explain it.

10 L2 CO4

b. Define the following terms with respect to first order predicate logic and given example each.

10 L2 CO4

- Term
- Atomic sentences
- Universal and existential quantifier
- Nested quantifier
- Equality.

## Module – 5

Q.9	a.	Write and explain backward chaining algorithm.	8	L2	CO5
	b.	What is Conjunctive Normal Form (CNF) write the CNF for the problem given below : i) Everyone who loves all animals is loved by someone ii) Anyone who kills an animal is loved by no one iii) Either Jack or curiosity killed the cat who is named Tuna iv) Did curiosity kill the cat?	12	L3	CO5

## OR

Q.10	a.	Explain in detail the planning as a state space search.	10	L2	CO5
	b.	Describe the process of planning graph for heuristic estimation. Write GRAPHPLAN algorithm.	10	L2	CO5

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