



CBCS SCHEME

18CS753

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Introduction to Artificial Intelligence

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define the following terms
- i) Artificial Intelligence
 - ii) Agent
 - iii) Search space
 - iv) Logical Reasoning
 - v) Expert tasks. (10 Marks)
- b. What are AI problem characteristics? Explain each with an example. (10 Marks)

OR

- 2 a. Define production system. Discuss the different categories (characteristics) of production system. (10 Marks)
- b. There are 2 water Jugs of 3 and 4 litre. Neither has any measuring marker. There is a tap that can be used to fill the Jugs with water. Indicate how 4-litre Jug can be filled half. Solve this water – Jug problem by giving complete set of production rules and state space tree. (10 Marks)

Module-2

- 3 a. Briefly explain the four approaches of knowledge representation with an example. (10 Marks)
- b. List the drawbacks of propositional logic. (04 Marks)
- c. Differentiate between procedural v/s declarative knowledge. (06 Marks)

OR

- 4 a. Define forward and backward reasoning formulate and show the complete steps of 8-puzzle for the following data:

Start State		
2	8	3
1	6	4
7		5



Goal State		
1	2	3
8		4
7	6	5

(10 Marks)

- b. Consider the following predicates:
- i) Man (Marcus)
 - ii) Pompeian (Marcus)
 - iii) Born (Marcus, 40)
 - iv) $\forall x : \text{man}(x) \rightarrow \text{mortal}(x)$
 - v) $\forall x : \text{pompeian}(x) \rightarrow \text{died}(x, 79)$
 - vi) erupted (Volcano, 79)
 - vii) $\forall x : \forall t_1 : \forall t_2 : \text{mortal}(x) \wedge \text{born}(x_1 t_1) \wedge \text{gt}(t_2 - t_1, 150) \rightarrow \text{dead}(x, t_2)$
 - viii) now = 1991
 - ix) $\forall x : \forall t : [\text{alive}(x, t) \rightarrow \sim \text{dead}(x_1 t)] \wedge [\sim \text{dead}(x_1 t) \rightarrow \text{alive}(x_1 t)]$
 - x) $\forall x : \forall t_1 : \forall t_2 : \text{died}(x, t_1) \wedge \text{gt}(t_2, t_1) \rightarrow \text{dead}(x_1 t_2)$
- Prove that : $\sim \text{alive}(\text{marcus}, \text{now})$. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. What is non monotonic reasoning? Explain the 2 approaches of default reasoning. (10 Marks)
b. Discuss the importance of truth maintenance system and their types. (10 Marks)

OR

- 6 a. Explain Dempster-Shafer theory with example. (10 Marks)
b. State and prove (Bayes) theorem for conditional probability. (10 Marks)

Module-4

- 7 a. Briefly explain the MINIMAX algorithm with example. (10 Marks)
b. Explain iterative deepening. Write algorithms for depth first iterative deepening and iterative deeping A*. (10 Marks)

OR

- 8 a. Explain the different steps in natural language understanding process. (10 Marks)
b. List and explain the various spell checking techniques. (10 Marks)

Module-5

- 9 a. Define Learning. Explain rote learning with example. (10 Marks)
b. Discuss the different learning techniques with respect to problem-solver. (10 Marks)

OR

- 10 a. You work for a software company. You receive an order to develop an expert system for movie feedback analysis. Iterate how you would efficiently design it. (10 Marks)
b. Given a chatbot how would you acquire and accumulate knowledge needed for it to work seamlessly. (10 Marks)
