

**Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020**  
**Artificial Intelligence**

Time: 3 hrs.

Max. Marks: 100

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

**Module-1**

- 1 a. Explain the components and categories of production system. List the requirement of good control strategies. (10 Marks)
- b. Explain steepest Hill climbing technique with an algorithm. Comment on its drawbacks and how to overcome these drawbacks. (10 Marks)

**OR**

- 2 a. Consider trying to solve the 8-puzzle instance given below using Hill climbing. Apply any heuristic function appropriate to solve the problem. (10 Marks)

Start state	End state
2 8 3	1 2 3
1 4	8 4
7 6 5	7 6 5

- b. List and explain the problem characteristics which must be analyzed before deciding on a proper heuristic search. (10 Marks)

**Module-2**

- 3 a. Consider the following sentences:
- John likes all kinds of food.
  - Apples are food.
  - Anything anyone eats and isn't killed by is food.
  - Bill eats peanuts and is still alive.
  - Sue eats everything Bill eats.
- (i) Translate all the sentences into formulas in predicate logic.  
(ii) Convert formulas from previous step into clause form.  
(iii) Prove that John likes peanuts using resolution. (12 Marks)
- b. Differentiate between forward and backward reasoning and list the factors that influences the choice between them. (08 Marks)

**OR**

- 4 a. Define CNF. Give an algorithm for converting given propositions to CNF. (10 Marks)
- b. Explain the different approaches used for knowledge representation and list the qualities a good knowledge representation system should possess. (10 Marks)

**Module-3**

- 5 a. Explain Justification based Truth Maintenance System (JTMS). What are the two critical criterion that must be met during labeling of JTMS and illustrate with suitable example. (10 Marks)
- b. What are portioned semantic nets? Express the following quantified expression using semantic nets:
- (i) Every dog has bitten a mail carrier.  
(ii) Every dog in town has bitten the constable. (10 Marks)

**OR**

- 6** a. What are the key issues in non-monotonic reasoning system? Explain the two approaches used for logic representation for non-monotonic reasoning. (10 Marks)  
 b. Define Bayes theorem. What are its limitations? How certainty factor is used to overcome its limitation? (10 Marks)

**Module-4**

- 7** a. Explain the conceptual dependency representation of an event or action. (10 Marks)  
 b. Explain MINMAX search with appropriate algorithm. (10 Marks)

**OR**

- 8** a. What is global ontology? What are the distinctions provided by Global ontology for defining a ‘thing’? (10 Marks)  
 b. What are scripts? Explain the important components of a script with an example. (10 Marks)

**Module-5**

- 9** a. Explain the usage of Soundex Algorithm for phonetic based spell checking with suitable example. (10 Marks)  
 b. Write a note on knowledge acquisition. (10 Marks)

**OR**

- 10** a. List and explain the steps involved in natural language processing. (10 Marks)  
 b. What is Analogy based learning? Differentiate between transformations analogy and derivational analogy. (10 Marks)

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