INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
(Dundigal-500043, Hyderabad)
B.Tech V SEMESTER END EXAMINATIONS (REGULAR) - DECEMBER 2022
Regulation:UG20
ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Time: 3 Hours   CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)   Max Marks: 70

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) What is an artificial intelligence (AI) technique? How do AI systems replicate intelligent behavior? Explain some of the task domains of AI.   [BL: Understand| CO: 1|Marks: 7]

   (b) Describe a problem as state space search? Consider the problem of "Playing Chess" and explain the concept in detail.   [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) List out the factors to justify whether the reasoning is to be done in forward or backward reasoning? Explain forward chaining with an example.   [BL: Understand| CO: 2|Marks: 7]

   (b) Determine that Harry is faster than Ralph from the following sentences:
   Horses are faster than dogs and there is a greyhound that is faster than every rabbit. We know that Harry is a horse, and that Ralph is a rabbit, also prove the statement using the inference rules.

   [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) Summarize A* algorithm. Explain optimal search A* algorithm in detail. Write the advantages and disadvantages of using A* algorithm.   [BL: Understand| CO: 2|Marks: 7]

   (b) Outline uninformed and informed search techniques. Compare uniformed and
   informed search. Explain best-first search with algorithms.   [BL: Apply| CO: 4|Marks: 7]

4. (a) Demonstrate Expectimax search algorithm with an example. List the properties of Expectimax.

   [BL: Understand| CO: 2|Marks: 7]

   (b) Construct a tree to explain how iterative deepening technique is a combination of depth first search and breadth first search.   [BL: Apply| CO: 4|Marks: 7]

MODULE – IV

5. (a) Explain the different approaches to reasoning under uncertainties. Enumerate non-monotonic reasoning.   [BL: Remember| CO: 3|Marks: 7]

(b) In a private company three persons A, B and C have applied for a job. The chance of their selections is in the ratio 1: 2 : 4. The probabilities that A, B and C can introduce changes to improve the profits of the company are 0.8, 0.5 and 0.3, respectively. If the change does not take place, find the probability that it is due to the appointment of C using the Bayes theorem

[BL: Apply| CO: 4|Marks: 7]

6. (a) State the purpose of Bayesian networks. Discuss the basic components of Bayesian networks. Discuss Bayesian network with an example. [BL: Remember| CO: 3|Marks: 7]

(b) Identify the proper reasons for the need of Dempster Shafer theory. and list out the characteristics, advantages and disadvantages of Dempster Shafer theory. [BL: Understand| CO: 6|Marks: 7]

MODULE – V

7. (a) Organize the steps for developing an expert systems. Write the benefits of expert systems.

[BL: Understand| CO: 6|Marks: 7]

(b) Identify different types of learning methods and explain in detail the perceptron learning algorithm.

[BL: Understand| CO: 6|Marks: 7]

8. (a) Illustrate the need of backward chaining approach in rule based expert systems with an example.

[BL: Understand| CO: 6|Marks: 7]

(b) Describe the nonlinear planning using constraint posting and also explain the nonlinear planning algorithm. [BL: Understand| CO: 6|Marks: 7]

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