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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(CSE Engg.) (E-I) (Sem.-2)

**ARTIFICIAL INTELLIGENCE**

Subject Code : CS-510

M.Code : 35411

Time : 3 Hrs.

Max. Marks : 100

**INSTRUCTION TO CANDIDATES :**

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. a. What is Artificial Intelligence? Explain along with any two applications.  
b. What is the difference between a performance measure and a utility function? Explain.
2. a. Explain why problem formulation must follow goal formulation.  
b. Describe a search space in which iterative deepening search performs much worse than depth-first search.
3. The travelling salesperson problem (TSP) can be solved using the minimum spanning tree (MST) heuristic, which is used to estimate the cost of completing a tour, given that a partial tour has already been constructed. The MST cost of a set of cities is the smallest sum of the link costs of any tree that connects all the cities.  
a. Show how this heuristic can be derived using a relaxed version of the TSP?  
b. Show that the MST heuristic dominates straight-line distance.
4. a. Some agents make inferences as soon as they are told a new sentence, while others wait until they are asked before they do any inferencing. What difference does this make at the knowledge level, the logical level, and the implementation level?  
b. Represent the following sentences in first-order logic, using a consistent vocabulary (which you must define):
  - i. Not all students take both History and Biology.
  - ii. Only one student failed in History.
  - iii. Only one student failed in both History and Biology.
  - iv. The best score in History was better than the best score in Biology.
  - v. Every person who dislikes all vegetarians is smart.



5. Write down logical representations for the following sentences, suitable for use with Generalized Modus Ponens:
  - a. Horses, cows and pigs are mammals.
  - b. An offspring of a horse is a horse.
  - c. Bluebeard is a horse.
  - d. Bluebeard is Charlie's parent.
  - e. Offspring and parent are inverse relations.
  - f. Every mammal has a parent
6. What are the various types of learning? Explain with examples.
7. Write a short note on planning and acting in real world. Explain important steps in planning with an example.
8. Write note on the following :
  - a. Perception in AI
  - b. Probabilistic reasoning
  - c. Probabilistic language processing
  - d. Communication

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**