

1078  
B.E. (Electronics and Communication Engineering)  
Seventh Semester  
Departmental Elective – IV  
EC-705: Artificial Intelligence

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 (Section-A) which is compulsory and selecting two questions each from Section B-C.

x-x-x

SECTION-A

1. (a) Define artificial intelligence.
- (b) Differentiate Uninformed and Informed search strategies.
- (c) List out the advantages of non-monotonic reasoning.
- (d) What is a constraint satisfaction problem?
- (e) Define Bayes theorem.
- (f) The traveling salesman problem involves (n) cities with paths connecting the cities. The time taken for traversing through all the cities, without knowing in advance the length of a minimum tour is \_\_\_\_\_.
- (g) What is unification?
- (h) Illustrate the use of First order logic to represent the knowledge.
- (i) What is expert system shell?
- (j) List various tasks of natural language processing.

10x1=10

SECTION-B

2. (a) What is the basic idea behind turing test? Explain how it is done? What is the interpretation? List six tasks where AI systems have been able to achieve success or limited success
- (b) Define rational agent. Explain four things at which rational agent at any given time depend. Give PEAS description of Medical Diagnosis System. 5,5
3. (a) Consider the following problem:  
A salesperson has to visit a group of cities, visiting each only once and getting back to the starting city. The objective is to minimize the total distance travelled. Assume each city is directly connected to each other city.
  - i) Describe a state space representation for the problem, specifying initial state, goal state and operators.
  - ii) For a problem with n cities, how many states are there in search space? Explain briefly your answer.

(b) Explain A\* Search technique. How it is different from Hill Climbing search technique? 5,5

4. (a) Consider the following sentences:

- (i) John likes all kinds of food.
- (ii) Apple is food.
- (iii) Chicken is food.
- (iv) Anything anyone eats and is not killed by is food.
- (v) Bill eats peanuts and is still alive.
- (vi) Sue eats everything Bill eats.

a. Translate these sentences into formulas in predicate logic.

b. Covert the formula of (a) into clausal form.

c. Prove that 'John likes peanuts' using resolution.

(b) What are the components of a planning system? Explain briefly how these components can be implemented?

6, 4

#### SECTION-C

5. (a) Explain minimax search procedure for two players. How the performance of minimax procedure can be further improved.

b) What are four main features of a knowledge representation language? Elaborate. 5,5

6. (a) What is an Expert System? Explain the role of knowledge in design of Expert System. Explain the architecture of an Expert System.

(b) Explain principles of semantic networks. Make semantic network of following statements:  
"Tom is a ginger coloured cat owned by John. Tom caught a bird". 5, 5

7. Write short note on the following:

- i) Skolemization
- ii) Applications of AI
- iii) Matching
- iv) Partial order planner

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