B.E. (Information Technology) Seventh Semester (C.B.S.)

Artificial Intelligence

P. Pages : 2 **NRT/KS/19/3584**

Time : Three Hours * 0 3 0 1 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Assume suitable data whenever necessary.
3. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Define A.I and applications of A.I. **6**

b) Analyze the different problem characteristics for the following problems:- **7**
i) 8 - puzzle problem
ii) Traveling salesman problem
iii) Chess playing

OR

2. a) Give the state space representation of the water jug problem & give one solution to it. **6**

b) What are production systems? Write the difference between monotonic and non-monotonic production system. Give one example of each. **7**

3. a) Explain Hill climbing techniques and problems associated with it. **7**

b) Write and explain A* algorithm with suitable example. **7**

OR

4. a) Explain means-ends analysis for robot navigation, mention the robot operators and also write the difference table. **6**

b) Explain constraint satisfaction problem with respect to the cryptarithmetic problem given below:- **8**

$$\begin{array}{r} \text{SEND} \\ +\ \text{MORE} \\ \hline \text{MONEY} \end{array}$$

5. a) Write about the issues in knowledge representation in solving AI problems. Explain tham. **7**

b) What do you mean by ontology? State the purpose of ontology. Discuss the types of ontology with example. **6**

OR

6. a) What is resolution principle? Write an algorithm for resolution in propositional logic. **6**

b) Explain the way of knowledge representation and also the properties of knowledge representation system. **7**

7. a) Represent the following statements in predicate logic:- 8
   i) The owner of a bike also own a car.
   ii) Everyone is loyal to someone.
   iii) All the courses in Information Technology are easy.
   iv) Joe eats orange and Still alive

   b) What is script? Write a script for "Visiting to a cinema hall'. 6

OR

8. a) Write a short note on RTN with suitable diagram. 7

   b) Develop a parse tree for the sentence "Rosy met a boy in the coffee house" using the rules given below:- 7

   $S \rightarrow NP / VP$

   $NP \rightarrow N \mid DET\ N.PP \mid DET\ N$

   $VP \rightarrow V\ NP$

   $PP \rightarrow PREP\ NP$

   $N \rightarrow Roma \mid boy \mid theater$

   $V \rightarrow Met$

   $DET \rightarrow a \mid the$

   $PREP \rightarrow in \mid with$

9. a) State various types of learning methods and explain with example. 6

   b) Explain the following in detail any one: 7
   i) Architecture of Rule Based Export system
   ii) Knowledge Engineering Process.

OR

10. a) Differentiate the following pairs 6
   i) Database versus knowledge Base
   ii) Conventional system versus Expert system.

   b) List and explain the characteristics of Expert system. 7

11. a) What do you mean by posterior probability prior probability? Explain the need of Bayes theorem in AI. 6

   b) Explain the following **any two.** 7
   i) Membership function ii) Crisp set
   iii) Applications of fuzzy logic iv) Certainty factor (CF)

OR

12. a) What do you mean by certainty factor? How we can find the CF for proving certainty of any hypothesis? 7

   b) Explain Bayesian network with suitable example. 6

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