[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2125)

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M. Tech 3rd Semester Examination

Artificial Intelligence and Expert Systems

CSE1-E02/MT-E02

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one from each of the Sections A, B, C & D. Section E is compulsory.

SECTION - A

1. (a) Define artificial intelligence. Explain the procedure of knowledge acquisition with the help of a diagram. (10)

   (b) Describe the differences between rules and mathematical logic with respect to the representation and processing of knowledge. What are the respective advantages and problems? (10)

2. (a) Describe a rule based system. How would you determine whether a particular task could be readily solved by a rule based system? (10)

   (b) Explain hill climbing algorithm. What are its shortcomings? (10)

SECTION - B

3. (a) What is truth maintenance system? What are its advantages? (10)

[P.T.O.]

   (b) Use resolution refutation to show that given $(p \Leftrightarrow q)$ and $(q \Leftrightarrow r)$, it follows that $(p \Leftrightarrow r)$. (10)

4. (a) Is the Propositional Logic sentence $(A \Leftrightarrow B) \wedge (\neg A \vee B)$ valid, unsatisfiable, or satisfiable? Explain your answer. (10)

   (b) Describe symbolic reasoning under uncertainty. (10)

SECTION - C

5. (a) Why the processing of natural language with computer is difficult? Explain with suitable examples. (10)

   (b) What is a parse tree? Show three parse trees that would be derived for the sentence *Kity flew to London and Paris in February*. (10)

6. (a) Define what is meant by the *semantics* of a natural language utterance, and how this differs from the pragmatics? Explain with the help of suitable examples. (10)

   (b) Differentiate between natural language processing and natural language understanding. (10)

SECTION - D

7. (a) Explain various steps used in pattern recognition system. (10)

   (b) Describe the architecture of computer enabled speech recognition system. (10)

8. (a) What is a supervised learning? How is it different from unsupervised learning? (10)

   (b) What do you mean by rule based expert system? Explain its architecture. (10)

SECTION - E

9. (a) List the major advantages of artificial intelligence over natural intelligence.

(b) Differentiate between database and knowledge base.

(c) Explain the difference between forward chaining and backward chaining and the situations where each one is more appropriate.

(d) What is difference between pattern recognition and classification?

(e) Explain derivational morphology.

(f) How knowledge can be represented using graphs?

(g) Explain finite-state transducer.

(h) Give one example of ambiguity in NLP and explain why we have to resolve it.

(i) Define speech recognition and understanding.

(j) What are the benefits of deploying an expert system on the Web? (10×2=20)