Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(CSE Engg.) (E-I) (Sem.–2)
ARTIFICIAL INTELLIGENCE
Subject Code : CS-510
Paper ID : [E0696]

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. Translate the following quotation into first-order logic. You may use more than one logical sentence if you wish. Convert this to clause form

   "*You can fool some of the people all of the time, and all of the people some of the time, but you can't fool all of the people all of the time.*"

   b. What is A* search? Explain various stages of A* search with an example.

2 a. Determine whether the following is Satisfiable, Contradictory or Valid:

   $$(P \wedge Q) \vee \rceil (P \wedge Q)$$

   b. Give the clausal form of the following expression

   $$\exists x \ \forall y \ (\forall z \ P(f(x), y, z) => (\exists u \ Q(x,y) \wedge \exists \ v \ R(y,v)))$$

3 a. What are the main advantages in keeping the knowledge base separate from the control module in knowledge based systems?

   b. Under what conditions would it make sense to use both forward and backward chaining? Give an example where both are used.

4 Consider the following sentences :

   John likes all kinds of food

   apples are food

   Chicken is food

   Anything anyone eats and is not killed by is food

   Bill eats peanuts and is still alive

   Sue eats everything Bill eats

   a. Convert the formulas in predicate logic and into clause form

   b. Prove that John likes peanuts using forward and backward chaining

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5   a.   What are the various characteristics of production system?

       b.   What are the features of semantics net? Explain with example.

6   a.   Develop a parse tree for the sentence "Jack slept on the table" using the following rules

       $S \longrightarrow NP\ VP$

       $NP \longrightarrow N$

       $NP \longrightarrow DET\ N$

       $VP \longrightarrow V\ PP$

       $PP \longrightarrow PREP\ NP$

       $N \longrightarrow jack\ |\ table$

       $V \longrightarrow slept$

       $DET \longrightarrow the$

       $PREP \longrightarrow on$

       b.   What are the various parsing techniques in natural language processing? Discuss.

7   a   How grammar free analyzers are used in natural language understanding?

       b   What are the various Heuristics Search techniques used in Artificial intelligence?

8   Write short notes on :

       a.   MiniMax Search technique

       b.   Pragmatic Processing