



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/M.TECH(IT-SE)/SEM-3/MSE-302-B/2012-13**

**2012**

**ARTIFICIAL INTELLIGENCE**

*Time Allotted : 3 Hours*

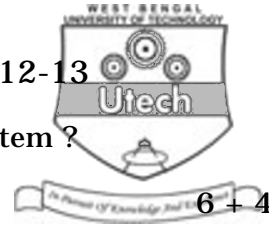
*Full Marks : 70*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer any *five* questions.

1. a) When do we refer a Machine as intelligent ? Define 'Thinking Machine'. Compare and contrast it with 'Intelligent Systems'. 2 + 3
  
- b) What are the components of a Partial Turing Test ? 6
  
- c) Explain the following terms associated with A.I. : 3
  - i) Knowledge
  
  - ii) Intelligence
  
  - iii) Perception.



2. a) What do you mean by Production System ?

Consider the following problems :

6 + 4

A farmer has a wolf, goat and cabbage on the left side of the river. He has a boat that can carry at most one of the three with him, and he must support this trio to the right bank. The problem is that he dare not leave the wolf with goat or goat with the cabbage.

How does he do the transportation ?

Develop a production system for the above problem.

b) What are the benefits of a production system ? 4

3. a) Write down the Best First Search algorithm for searching solution in the state space. 4

b) What do you mean by Heuristic ? Explain with an example / illustration. What is admissible and consistent heuristic ? 4 + 2

c) Compare and contrast Best First Search with A\* algorithm. 4

4. a) Write down the 'Hill Climbing' algorithm. Compare and contrast simple and steepest Ascent Hill Climbing. 4 + 2

b) Write down the A\* algorithm. 4

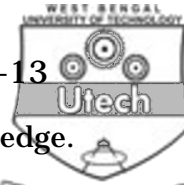
c) What are the problem characteristics those must be analysed to formulate intelligent system ? 4



5. a) What do you mean by constraint-satisfaction problem ?  
Write down the constraint-satisfaction algorithm.
- b) Solve the following crypt-arithmetic problem employing constraint satisfaction :

$$\begin{array}{r}
 \text{S E N D} \\
 + \text{M O R E} \\
 \hline
 \text{M O N E Y}
 \end{array}$$

6. a) What do you mean by First Order Predicate Logic ( FOPL ) ? 2  
Explain the merits and demerits of conversion from sentential form to propositional form. 2
- b) Represent the following as wff : 6
- i) Sam is Bill's father.
  - ii) Harry is one of Bill's ancestor.
  - iii) Every ancestor of Bill is either his father, his mother or one of their ancestor.
- c) Explain resolution theorem with illustration. 4
7. The game of NIM is played as follows :  
Two players alternatively can remove one, two or three pennies from a stack of initially containing five pennies.  
The player who picks up last penny loses.
- a) Draw the full game tree 4
  - b) Show that the player who has the second move can always win. 4
  - c) Execute  $\alpha$ - $\beta$  pruning procedure on game tree. How many terminal nodes are examined ? 6



8. a) Write down the different forms of knowledge. 4
- b) Explain forward representation mapping vs Backward representation mapping. 2
- c) Explain mapping between fact and representation. 4
- d) Write short notes on the following : 4
- i) Fuzzy Logic
  - ii) Neural Network.

