Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II– EXAMINATION – WINTER - 2016

Subject Code: 2722314 Date: 19/11/ 2016

Subject Name: Artificial intelligence for information technology

Time: 2:30 pm to 5:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 (a) **07**

(i) What data structures need to be used for Tic-Tac-Toe?
(ii) Write algorithm for Tic-Tac-Toe.
(iii)Analyze the algorithm for complexity.

(b) Trace the constraint satisfaction procedure solving the following cryptaarithmetic problem. **07**

```
  D O N A L D
+ G E R A L D
-------------
  R O B E R T
```

Q.2 (a) **07**

(i) A hungry monkey finds himself in a room in which a bunch of bananas is hanging from the ceiling. The monkey, cannot reach the bananas. In the room, there are also a chair and a stick. The ceiling is just the right height so that a monkey standing on a chair could knock the bananas down with the stick. The monkey knows how to move around, carry other things around, reach for the bananas and wave a stick in the air. What is the best sequence of actions for the monkey to take to acquire lunch?

(ii) "Our best first search algorithm is not adequate for searching AND-OR graphs". True or false? Justify.

(b) Explain various approaches to knowledge representation. **07**

OR

(b) Explain the MINIMAX search procedure. **07**

Q.3 (a) Consider trying to solve the 8 puzzle using Hill climbing. Find a heuristic function that makes this work. Make sure it works on following example : **07**

start		
1	2	3
8	5	6
4	7	

Goal		
1	2	3
4	5	6
7	8	

(b) Explain Nonmontonic logic and Default logic in case of symbolic reasoning. **07**

OR

Q.3 **(a)** Consider the following set of sentences **07**

1. Marcus was a man.
2. Marcus was a Pompeian.
3. All Pompeians were Romans.
4. Caesar was a ruler.
5. All Romans were either loyal to Caesar or hated him.
6. Everyone is loyal to someone.
7. People only try to assassinate rulers they are not loyal to.
8. Marcus tried to assassinate Caesar.

Write the above sentences with predicate logic.

(b) Lung cancer - A patient has been suffering from breathlessness. He visits the doctor, suspecting he has lung cancer. The doctor knows that barring lung cancer, there are various other possible diseases the patient might have such as tuberculosis and bronchitis. Draw Bayesian network for this case. **07**

Q.4 **(a)** Explain **07**

(i) Learning with Macro-operators

(ii) Learning from Examples

(b) Write fuzzy rules that define a man to be very tall, tall, average, short and very short. Convert the fuzzy outputs average and short to a single crisp value. **07**

OR

Q.4 **(a)** Explain statistical methods for correlation and regression. **07**

(b) Explain **07**

(i) Single layer perceptron

(ii) Explain multilayer neural networks.

Q.5 **(a)** Explain the components of expert systems. **07**

(b) **07**

(i) What is local maximum, plateau, ridge?

(ii) Which are the ways of dealing with these problems?

(iii) For which situation hill climbing becomes unsuitable?

OR

Q.5 **(a)** Explain AO* algorithm. **07**

(b) Explain supervised and unsupervised learning. **07**

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