

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. Sem. – IInd - Examination – June/July- 2011****Subject code: 1710410****Subject Name: Introduction of Artificial Intelligence****Date: 01/07/2011****Time: 10:30 am – 01:00 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) Explain the types of problems solved by AI techniques and it's characteristics by which to classify them into different categories and classes. **07**

(b) Explain the algorithm for Propositional Resolution. **07**

Q.2 (a) Solve the Water-Jug problem using Production Rule System. **07**

(b) Attempt to unify the following pairs of expressions either with their most general unifiers or explain why they will not unify. **07**

(1) $p(X, Y)$ and $p(a, Z)$

(2) $p(X, X)$ and $p(a, b)$

(3) $\text{Ancestor}(X, Y)$ and $\text{Ancestor}(\text{Lovex}, \text{Father}(\text{Lovex}))$.

(4) $\text{Ancestor}(X, \text{Father}(X))$ and $\text{Ancestor}(\text{Rama}, \text{Sita})$.

OR

(b) Assume the following Facts: **07**

Rama only likes easy courses.

Engineering Courses are hard.

All the courses in the science department are easy.

EE101 is an electrical engineering course.

Use the Resolution to answer the question, "What course would Rama like?"

Q.3 (a) Solve the following Crypt-arithmetic Problem: **06**

$$\begin{array}{r} \text{I N D I A} \\ + \text{P A K} \\ \hline \text{P E A C E} \end{array}$$

(b) Explain the A* Algorithm **08**

OR

Q.3 (a) Explain mean-end analysis approach to solve the AI problems. **07**

(b) Make a state space representation for the following problems. **07**

(1) Eight Puzzle problem.

(2) Tower of Hanoi Problem.

(3) Traveling Salesman Problem.

Q.4 (a) Solve the Tic-Tac-Toe game playing with Min-Max Procedure. **08**

(b) Explain architecture and characteristics of Expert System. **06**

OR

Q.4 (a) Explain Verification, Validation and Design of Expert System. **07**

(b) Explain the Inference Engine for the Expert System. **07**

- Q.5 (a)** Let A and B be two Fuzzy numbers whose membership functions are given by **07**

$$A(x) = \begin{cases} (x+2)/2 & \text{for } -2 < x \leq 0. \\ (2-x)/2 & \text{for } 0 < x < 2. \\ 0 & \text{otherwise.} \end{cases}$$

Calculate the fuzzy numbers $A+B$, $A-B$, $A*B$, A/B , $\min(A,B)$, $\max(A,B)$.

- (b)** Explain Back propagation Training Algorithm. **07**

OR

- Q.5 (a)** Explain the following Artificial Neural Network: **09**

- (1) Feed Forward Neural Network
- (2) Recurrent Neural Network
- (3) Input Delay Feed-Forward Backpropagation Neural Network.

- (b)** Explain the features of Artificial Neural Network. **05**
