Code: CT71   **Subject: ARTIFICIAL INTELLIGENCE**

ALCCS

Time: 3 Hours | December - 2017 | **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:
- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1   a. What is artificial intelligence? Write various applications of AI.

   b. What is reasoning with uncertain information? Describe the Bayesian inferencing with suitable example?

   c. Describe the augmented transition network?

   d. Explain knowledge representation and reasoning in rule based expert system.

   e. What is artificial neural network (ANN)? Describe recurrent neural network.

   f. Define production system. State the different control strategies of the systems.

   g. Differentiate between a classical variable and a fuzzy variable? Define fuzzy linguistic variable and linguistic values?   **(7×4)**

Q.2   a. Define breadth-first and depth-first search strategies.   **(4)**

   b. What is a Heuristic search technique? Explain Hill climbing search technique.   **(6)**

   c. Describe A* Algorithm.   **(4)**

   d. Describe Constraint Satisfaction in problem solving.   **(4)**

Q.3   a. Explain Problem reduction with example. Describe the MINIMAX search strategy.
                                                                                         (8)
   b Explain the Alpha-Beta pruning strategy.   **(6)**

   c. Describe Iterative Deepening Algorithm.   **(4)**

Q.4   a. Describe propositional facts, rules and queries in PROLOG programming.   **(6)**

   b. Define Back-tracking in PROLOG programming.   **(6)**

   c. Briefly describe planning with Forward State Space Search.   **(6)**

Q.**5**   a.   What are various approaches to knowledge Representations?   **(3)**

b.   Define the extension principle of fuzzy set theory? The elements in two sets A and B are given as A = {0, 1} and B = {e, f, g}, find the Cartesian product A × B, B× A, B × B?   **(2)**

c.   In a boiler, pressure and temperature are linguistic parameters. Nominal pressure limit ranges from 300 to 1000 psi. Nominal temperature limit is 80-100∘C. The fuzzy linguistic usages are as follows: **(3)**
"Low temperature"= [1/80, 0.8/82, 0.6/84, 0.3/86, 0.2/88, 0/90]
"High pressure"= [0/300, 0.2/500, 0.3/600, 0.5/800, 0.7/900, 1/1000]
Find the membership function for "Temperature not very low" and "Pressure is extremely high"?

d.   The fuzzy sets A and B are defined as universe, x = [0, 1, 2, 3] with the following membership fractions: $\mu_A(x) = \frac{2}{x+3}$ and $\mu_B(x) = \frac{4x}{x+5}$ **(3)**
Define the intervals along the x-axis corresponding to the α cut sets for each fuzzy set A and B for α=0.2 and α=0.6?

e.   Define fuzzy inference system? Describe the Mamdani method of fuzzy inference system?   **(7)**

Q.**6**   a.   What is Machine learning? Describe supervised, unsupervised and deductive learning methods?   **(6)**

b.   State the difference between Perceptron network and ADALINE network?   **(4)**

c.   What is Multi-layer perceptron (MLP) network? Explain the Back propagation learning in MPL?   **(8)**

Q.**7**   a.   What is Genetic Algorithm? Describe its working principle.   **(7)**

b.   What is an intelligent agent? Describe the communication among agents with suitable examples?   **(4)**

c.   What is a state-space graph? Explain in details the uninformed and informed search techniques?   **(7)**