Mumbai University

October - 2018

B.Sc.IT: Semester – V
(Question Paper)
[Choice Based Syllabus]

Elective – I

Artificial Intelligence

Time: 2 ½ Hours   **Total Marks:** 75

Note:
(1) *All Questions (Q1 To Q5) are Compulsory.*
(2) *Figures on the right indicate total marks. All sub questions carry equal marks.*
(3) *Write the question numbers clearly, as mentioned in the question paper.*
(4) *Mixing of sub-questions is not allowed.*
(5) *Draw diagrams and give examples whenever necessary.*
(6) *Write the comments in the program/algorithm and write the assumptions, if any.*
(7) *Use of calculator or any electronic gadget is not allowed.*

Q.1   ATTEMPT ANY THREE QUESTIONS: (15 MARKS)

(A)   Differentiate between Deterministic and Stochastic Environment.   **(5)**
(B)   Define an Agent. What are the Key characteristics of an Agent?   **(5)**
(C)   Define Artificial Intelligence? Why is it important?   **(5)**
(D)   Define Crossword Puzzle as a Single Agent Environment.   **(5)**
(E)   Explain the concept of PEAS for medical diagnosis.   **(5)**
(F)   How is an Automobile Driver Agent being analyzed in the Task Environment?   **(5)**
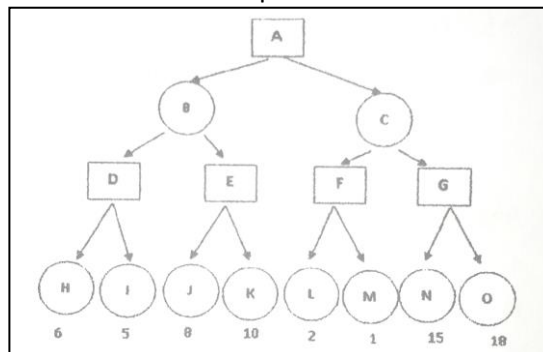
Q.2   ATTEMPT ANY THREE QUESTIONS: (15 MARKS)

(A)   Solve the Water-Jug problem. Give the state space for this problem and mention the control structure   **(5)**
       to solve the problem.
(B)   Prove the breadth first search is a special case of Uniform Cost Search.   **(5)**
(C)   Mention the Heuristic Function for TIC-TAC-TOE Game.   **(5)**
(D)   In a search algorithm what are the four ways of evaluating the performance of an algorithm.   **(5)**
(E)   Differentiate between Depth First Search and Breadth First Search.   **(5)**
(F)   What is meant by Belief State? Explain the Prediction Stage of Vacuum World.   **(5)**

Q.3   ATTEMPT ANY THREE QUESTIONS: (15 MARKS)

(A)   What are the Heuristics and what is their importance.   **(5)**
(B)   Explain Best First Search Algorithm.   **(5)**
(C)   <u>Solve the Puzzle.</u>   **(5)**
       *Once upon a time a farmer went to a market and purchased a fox, a goose, and a bag of beans. On
       his way home, the farmer came to the bank of river and rented a boat. But in crossing the river by
       boat, the farmer could carry only himself and a single one of his purchases: the fox, the goose, or the
       goose, or the bag of beans. If left unattended together, the fox would eat the goose would eat the
       beans. The farmer's challenge was to carry himself and his purchases to the far bank of the river,
       leaving each purchase intact. How did he do it?*
(D)   How does Steepest Ascent Hill Climbing Find Solutions?   **(5)**
(E)   Given the following search tree, apply the alpha-beta running algorithm to it and show the search tree   **(5)**
       that would be built by this algorithm. Make sure that you show where the alpha and beta cuts are
       applied and which parts of the search tree are pruned as a result.

(F)   Explain Local Search with an example.   **(5)**

Q.4   ATTEMPT ANY THREE QUESTIONS: (15 MARKS)

(A)   Explain the meaning of Knowledge Representation.   **(5)**

(B)   If P, Q, R the prepositions defined as   **(5)**
P: IT IS RAINING
Q: I HAVE THE TIME
R: I WILL GO TO A MOVIE
1. (~P^Q)<--> R
2. (Q-->R)^(R-->Q)
3. ~(QvR)
4. R-->~P^Q

(C)   Write short notes on Tautologies. Contradictions and Contingencies.   **(5)**

(D)   Explain the statements in Prepositional Logic: **(5)**
   1.   *If he campaigns hard, he will be elected.*
   2.   *If the humidity is high, it will rain either today or tomorrow.*
   3.   *Cancer will not be cured unless its cause is determined and a new drug for cancer is found.*
   4.   *It requires courage and skills to climb a mountain.*

(E)   REPRESENT the sentences in First Order Logic: **(5)**
   1.   *Lipton is a tea.*
   2.   *Lata is a child who drinks tea.*
   3.   *Ruma dislikes children who drink tea.*
   4.   *Ruma dislikes Lata.*

(F)   What is Logic? Mention its Role and Classification.   **(5)**

Q.5   ATTEMPT ANY THREE QUESTIONS: (15 MARKS)

(A)   Mention the basic components of a planning system.   **(5)**

(B)   Difference between Heuristic Knowledge and Tactic Knowledge.   **(5)**

(C)   Create a frame of the person: **(5)**
Anand who is a chemistry professor in RD Women's College.
His wife name is Sangita having two children Rupa and Shipa.

(D)   Explain knowledge acquisition with a diagram.   **(5)**

(E)   Explain syntax and semantics for Knowledge Representation.   **(5)**

(F)   In planning, explain STRIPS with the concept of forward chaining and Backward Channing.   **(5)**