Mid Semester Examination

Course Name: Artificial Intelligence Code: CS 571

Full Marks-30 Time: 2 hours

Answer ALL the questions

Make reasonable assumptions as and whenever necessary. You can answer the questions in any sequence. However, the answers to all the parts of any particular question should appear together.

1. Prove or disprove rigorously: "If monotone restriction is satisfied, nodes in the optimal path- assume only one optimal path- in the search graph will be expanded in the order of their depth from the start node. Assume there is no cycle in the search graph". **(7 marks)**

2. It is required to estimate the parameters for the throw of dice:
   a. Give the likelihood expressions when a dice is thrown. **(3 marks)**
   b. Give the likelihood expression when TWO dice are thrown. **(4 marks)**
   c. Give the likelihood expression when the choice of the dice in (b) is decided by throwing a coin whose probability value of getting head is known. **(6 marks)**

3.
   a) Express using predicate calculus the principle of mathematical induction. The principle, you recall, proves (i) a base case, (ii) sets up a hypothesis and then (iii) has the induction step. **(4 marks)**
   b) Express using a MIX of fuzzy logic and predicate calculus the following statements:
      i. Not everybody can be an athlete, but everybody can be reasonably fit.
      ii. If a student works hard, there will not be a professor in the student's department who will not be sympathetic to the student.

   Decide judiciously where to use fuzzy logic and where to use ordinary predicate calculus. Describe all the predicates you use precisely. In case of fuzzy predicates specify the linguistic variable and the profile carefully.

   (3+3= 6 marks)