COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)

END Semester Examination

Programme: B.Tech | **Semester: V**

Course Code: CT-17001 | **Course Name: Artificial Intelligence**

Branch: CE | **Academic Year: 2017-2018**

Duration: 3 hr | **Max Marks: 60**

Student MIS No.

Instructions:

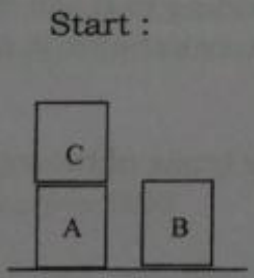
1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of stationery, calculator etc. not allowed.
5. Write your MIS Number on Question Paper.

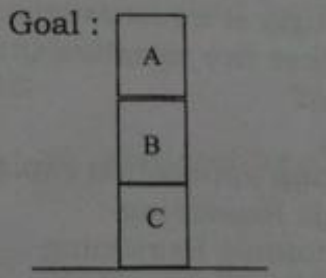
Q. 1. In order to choose most appropriate method for particular problem, it is necessary to analyse the problem considering following key dimensions : **4M**

- Is the problem decomposable into set of independent smaller or easier sub problems ?
- Can solution steps be ignored or undone if they prove unwise?
- Is the problem's universe predictable?
- What is the role of knowledge?
- Does the task requires Interaction with a person?

Analyse the following problems with respect to the above mentioned characteristics:

- 8 puzzle problem
- blocks world





Q. 2. Agents are used to increase the performance of its actions on Environment. What are the possible ways in which agents can improve its performance? **3M**

Q. 3. Discuss the performance issue of Constraint Satisfaction Heuristic Algorithm with the help of appropriate example. **3M**

Q. 4. Show how a JTMS could be used in medical diagnosis. Consider the rules as, " If you have a runny nose, assume you have a cold unless it is allergy season". **3M**

Q. 5. The "water jug problem" can be stated as follows: you are given two jugs, one that can hold 4 gallons of water and the other that can hold 3 gallons of water. You also have a pump that can be used to fill either jug with water, and you can empty the contents of either jug at any time. Your goal is to get exactly 2 gallons of water into the four-gallon jug. **4M**

Suppose that it costs $5 every time the pump is used, $2 every time you fill the four-gallon jug, and $1 every time you use the three-gallon jug. Describe how to find the lowest-cost solution to the problem.

Q. 6. Assume the following facts: **4M**

- Steve only likes easy courses
- Science courses are hard
- All the courses in the basket weaving department are easy
- BK301 is a basket weaving course

Use resolution to answer question, " what course would Steve like?"

Q. 7. Consider the following real variables from everyday life: **5M**

- Income measured in $UK.
- Speed measured in meters per second.
- A TV show measured in how much you are interested watching it.
- A meal measured in how much you like to eat it.
- A traffic light measured in what color is on.

In each case, suggest a fuzzy variable corresponding to these real variables. For which of these five variables the use of a fuzzy variable is not really necessary? Why?

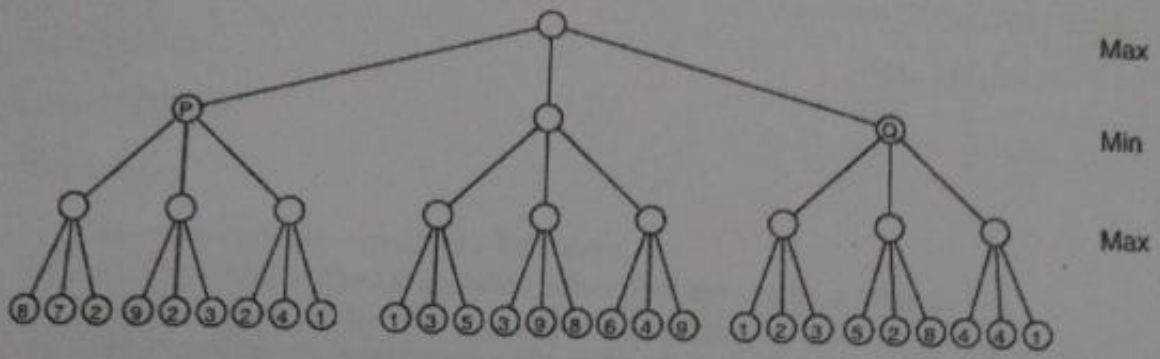
Q. 8. With a supporting application explain following types of reasoning : **6M**

a) Monotonic Reasoning
b) Non-monotonic Reasoning
c) Inductive Reasoning

Q. 9. Show how means-ends analysis could be used to solve the problem of getting from one place to another. Assume that the available operators are **walk, drive, take the bus, take a cab and fly**. **4M**

Q. 10. Problem Solving and Planning both strategies are used to find solution in Artificial Intelligence. Describe the differences and similarities between problem solving and planning. **4M**

Q. 11. The figure below is the game tree of a two-player game; the first player is the maximizer and the second player is the minimizer. Use the tree to answer the following questions: **6M**



(a) What is the final value of this game?

Consider running the alpha-beta pruning algorithm on this game tree.

(b) Is the final value of beta at the root node (after all children have been visited) +1? (T/F)

(c) What is the final value of beta at the node labeled P (after all of P's children have been visited)?

Suppose we are in the middle of running the algorithm. The algorithm has just reached the node labeled Q. The value of alpha is 5 and the value of beta is +1.

(d) Will any nodes be pruned ?

(e) What value will Q return to its parent?

Q. 12. Consider the problem faced by an infant learning to speak and understand a language. **4M**
Explain how this process fits into the general learning model, identifying each of the components of the model as appropriate.

OR

Explain perception and action in AI considering high end robotic structure/architecture **4M**

Q. 13. Briefly explain the architecture of an MYCIN Expert System with a neat sketch and explain its components. **4M**

Q. 14. Neuro-Fuzzy system is a Hybrid Intelligent System. **6M**
Justifying above statement explaining each layer in the Neuro-Fuzzy system is associated with a particular step in the fuzzy inference process.

OR

What do you understand by Multi-layer Feed Forward Artificial Neural Network? Explain various operations which can be performed in it along with architecture **6M**