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COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Govt. of Maharashtra)

End Semester Examination – NOVEMBER, 2013

(CT-413) ARTIFICIAL INTELLIGENCE

Class: - B. Tech (Computer Engineering &Information Technology)

Year: - 2013-14 **Semester: - VII**
Duration: - 3 hr **Max. Marks: - 60**

Instructions:

1. ***All the Questions are compulsory.***
2. ***Assume suitable data whenever necessary.***
3. ***Draw neat figures wherever required***
4. ***Figures to right indicate full marks***

Q. 1 A To what extent are the following computer systems instances of artificial intelligence: **5M**

a. Supermarket bar code scanners.

b. Web search engines.

c. Voice-activated telephone menus.

d. Internet routing algorithms that respond dynamically to the state of the network.

Q.1 B "Surely computers cannot be intelligent. They can do only what their programmers tell them." Is the latter statement true, and does it imply the former? Justify your answer with help of two examples. **5M**

Q.2 A For each of the following assertions, justify the statements and support your answer with examples or counterexamples where appropriate. **5M**

a. An agent that senses only partial information about the state cannot be perfectly rational.

b. There exist task environments in which no pure reflex agent can behave rationally.

c. There exists a task environment in which every agent is rational.

d. The input to an agent program is the same as the input to the agent function.

e. Every agent function is implementable by some program/machine combination.

Q.2	**B**	Give a complete problem formulation for each of the following. Choose a formulation that is precise enough to be implemented. a. Using only four colors, you have to color a planar map in such a way that no two adjacent regions have the same color. b. A 3-foot-tall monkey is in a room where some bananas are suspended from the 8-foot ceiling. He would like to get the bananas. The room contains two stackable, movable, climbable 3-foot-high crates.	**5M**
Q.3	**A**	Give a complete problem formulation for each of the following. Analyze the performance issues. a. You have a program that outputs the message "illegal input record" when fed a certain file of input records. You know that processing of each record is independent of the other records. You want to discover what record is illegal. b. You have three jugs, measuring 12 gallons, 8 gallons, and 3 gallons, and a water faucet. You can fill the jugs up or empty them out from one to another or onto the ground. You need to measure out exactly one gallon.	**5M**
Q.3	**B**	Prove that if a heuristic is consistent, it must be admissible. Construct an admissible heuristic that is not consistent.	**5M**
Q.4	**A**	Mention the various types of Reasoning along with its explanation and supporting applications	**5M**
Q.4	**B**	Discuss the performance issues for Constraint Satisfaction Heuristic Algorithm with help of appropriate example.	**5M**
Q.5	**A**	Compare the performance issues of Goal Stack Planning and Non Linear Constraint Posting Planning with appropriate example.	**5M**
Q.5	**B**	Write Short note on : 1. Knowledge Representation using Non Monotonic Logic 2. Semantic Nets & Frames	**5M**

Q.6 **A** Consider the problem faced by an infant learning to speak and understand a language. Explain how this process fits into the general learning model. Describe the percepts and actions of the infant, and the types of learning the infant must do. Describe the sub-functions the infant is trying to learn in terms of inputs and outputs, and available example data. **5M**

Q.6 **B** Suppose we generate a training set from a decision tree and then apply decision-tree learning to that training set. Is it the case that the learning algorithm will eventually return the correct tree as the training-set size goes to infinity? Why or why not? **5M**