

**R16**

Code No: 137AP

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year I Semester Examinations, December - 2019**

**ARTIFICIAL INTELLIGENCE**  
(Common to ECE, IT)

**Time: 3 Hours**

**Max. Marks: 75**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

**PART - A**

**(25 Marks)**

- 1.a) What is turing test? [2]
- b) Define AI. Write the applications of AI. [3]
- c) Define Modus Ponens's rule in Propositional logic. [2]
- d) Write the following in a predicate logic.  
There is a barber who shaves all men in town who do not shave themselves.  
No person likes a professor unless the professor is smart.
- e) What is ontology in AI? [3]
- f) What do you mean by Knowledge representation? [2]
- g) Quote an example for planning graph. [3]
- h) What is the significance of planning in AI systems? [2]
- i) What is Bayes' rule and write its use? [3]
- j) Define uncertainty. What is prior probability and conditional probability? [3]

**PART - B**

**(50 Marks)**

- 2.a) What is an intelligent agent? Write the structure of intelligent agent? [5+5]
- b) Write about Breadth first search algorithm?  
**OR**
- 3.a) From the AI literature to write whether or not the following tasks can currently be solved by computers:
  - i) Playing a decent game of table tennis (ping-pong).
  - ii) Playing a decent game of bridge at a competitive level.
  - iii) Discovering and proving new mathematical theorems.
  - iv) Writing an intentionally funny story.
  - v) Giving competent legal advice in a specialized area of law.
  - vi) Translating spoken English into spoken Swedish in real time.
- b) Would a bidirectional A\* search be a good idea? Under what conditions would it be applicable? Describe how the algorithm would work. [3+7]
4. Explain in detail about adversarial search. [10]  
**OR**
5. What is constraint satisfaction problem and explain with an example how it is solved through back propagation search. [10]



6.a) Write down logical representations for the following sentences, suitable for use with Generalized Modus Ponens:

- i) Horses, cows, and pigs are mammals.
- ii) An offspring of a horse is a horse.
- iii) Bluebeard is a horse.
- iv) Bluebeard is Charlie's parent.
- v) Offspring and parent are inverse relations.
- vi) Every mammal has a parent.

b) Explain with an example about forward and backward chaining. [5+5]

OR

7.a) What is resolution? Use resolution and solve the given problem.

Jack owns a dog. Every dog owner is an animal lover. No animal lover kills an animal. Either Jack or Curiosity killed the cat, who is named Tuna. Did Curiosity kill the cat?

b) List out the different types of reasoning systems. Differentiate monotonic and non monotonic reasoning? [6+4]

8. Compare and contrast Hierarchical planning and Multi agent planning. [10]

OR

9. Some domains have resources that are monotonically decreasing or increasing. For example, time is monotonically increasing, and if there is a Buy operator, but no Earn, Beg, Borrow, or Steal, then money is monotonically decreasing. Knowing this can cut the search space: if you have a partial plan whose steps require more money than is available, then you can avoid considering any of the possible completions of the plan.

- a) Explain how to determine if a measure is monotonic, given a set of operator descriptions.
- b) Design an experiment to analyze the efficiency gains resulting from the use of monotonic resources in planning. [10]

10.a) Is probabilistic reasoning monotonic or nonmonotonic? Do these concepts even apply to probabilities?

b) After your yearly checkup, the doctor has bad news and good news. The bad news is that you tested positive for a serious disease, and that the test is 99% accurate (i.e., the probability of testing positive given that you have the disease is 0.99, as is the probability of testing negative given that you don't have the disease). The good news is that this is a rare disease, striking only one in 10,000 people. Why is it good news that the disease is rare? What are the chances that you actually have the disease? [4+6]

OR

11.a) What is inductive learning? Explain with example.

b) With the block diagram explain the general model for learning. [4+6]

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