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# TCS–801/TIT–801

## B. TECH. (CS/IT)
## (EIGHTH SEMESTER)
## END SEMESTER EXAMINATION, 2018

### ARTIFICIAL INTELLIGENCE

**Time : Three Hours**

**Maximum Marks : 100**

**Note :** (i) This question paper contains five questions with alternative choice.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mentioned against it.

(iv) Each part carries **ten** marks. Total marks assigned to each question are **twenty.**

1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Define the following terms :

(i) Intelligence

(ii) Artificial Intelligence

(iii) Rationality

(iv) Autonomy

(v) Turing Test



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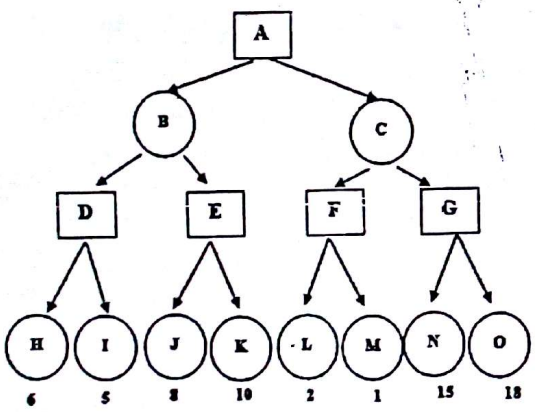
(b) What is an agent ? Discuss the properties of task environment. Explain with diagram various kinds of agent program.

(c) Given the following search tree, apply the alpha-beta pruning algorithm to it and show the search tree 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 :




2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What is Natural Language Processing (NLP) ? Explain various steps involved in NLP and different components of NLP.





(b) What is Context Free Grammar (CFG) ? Write CFGs for the following languages :

(i) Strings ending with a 0

(ii) Strings containing even number of l's.

Explain why the grammar below is ambiguous :

$$S \rightarrow 0A \mid 1B$$

$$A \rightarrow 0AA \mid 1S \mid 1$$

$$B \rightarrow 1BB \mid 0S \mid 0$$

(c) Write short notes on the following :

(i) Fillmore case grammar

(ii) Transition networks

(iii) Sentence generation and translation

3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Consider the following sentences :

(i) John likes all kinds of food.

(ii) Apples are food.

(iii) Chicken is food.

(iv) Anything anyone eats and isn't killed by is food.

(v) Bill eats peanuts and is still alive.

(vi) Sue eats everything Bill eats :

(I) Translate these sentences into formulas in predicate logic.

(II) Prove that John likes peanuts using backward chaining.

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(b) Write short notes on the following :

(i) Horn Clause

(ii) Minskey Frames

(c) What are Rule Based Systems ? Explain forward and backward chaining techniques. Also discuss methods used for conflict resolution.

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What is Expert System ? Explain various characteristic features of Expert System. Also discuss applications of Expert Systems.

(b) Describe and compare the different types of problems solved by the expert systems : DENDRAL, MYCIN.

(c) Write short notes on the following :

(i) Use of Meta-Knowledge in Expert System Inference

(ii) Expertise Transfer

(iii) Major Problems faced by current expert systems

5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Explain the pattern recognition and pattern classification process with diagram. Also discuss various approaches to the recognition problem.





(b) Write a function for the following in LISP :

(i) Define the function average, which will take two numbers as arguments and compute their average.

(ii) Write a function that computes the factorial of a number.

(c) Write short notes on the following :

(i) Machine Perception

(ii) Speech Recognition



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