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**CS 131801**



Roll No. of candidate | | | | | | | | | | |

**2019**

**B.Tech. (CSE) 8th Semester End-Term Examination**

**ARTIFICIAL INTELLIGENCE**

Full Marks – 100 Time – Three hours

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The figures in the margin indicate full marks for the questions.

1. Answer the following Multiple Choice questions : (1 × 10 = 10)

(i) Which search strategy is also called as blind search?

(a) Uninformed search

(b) Informed search

(c) Simple reflex search

(d) All of the mentioned

(ii) Which search is implemented with an empty first-in-first-out queue?

(a) Depth-first search

(b) Breadth-first search

(c) Bidirectional search

(d) None of the mentioned

[Turn over

(iii) Which is used to improve the performance of heuristic search?

(a) Quality of node

(b) Quality of heuristic function

(c) Simple form of nodes

(d) None of the mentioned

(iv) How many states are available in state-space search?

(a) 1 (b) 2

(c) 3 (d) 4

(v) Hill-Climbing algorithm terminates when,

(a) Stopping criterion met

(b) Global Min/Max is achieved

(c) No neighbor has higher value

(d) All of the mentioned

(vi) A* algorithm is based on

(a) Breadth-First-Search

(b) Depth-First-Search

(c) Best-First-Search

(d) Hill climbing.

(vii) What is the goal of artificial intelligence?

(a) To solve real-world problems

(b) To solve artificial problems

(c) To explain various sorts of intelligence

(d) To extract scientific causes

(viii) Which of the following is an advantage of using an expert system development tool?

(a) imposed structure

(b) knowledge engineering assistance

(c) rapid prototyping

(d) all of the mentioned

(ix) Translate the following statement into FOL.

"For every a, if a is a philosopher, then a is a scholar"



(a) $\forall$ a philosopher(a) scholar(a)

(b) $\exists$ a philosopher(a) scholar(a)

(c) All of the mentioned

(d) None of the mentioned

(x) Which kind of planning consists of successive representations of different levels of plan?

(a) Hierarchical planning

(b) Non hierarchical planning

(c) Project planning

(d) All of the mentioned

Answer any six(6) $(6 \times 15 = 90)$

2. Answer the following $(5 \times 3 = 15)$

(a) Define Artificial Intelligence (AI)

(b) What are the various problem characteristics?

(c) Define expert system

(d) What is the state space representation?

(e) What are the key issues of search algorithm?

3. Answer the following $(5 \times 3 = 15)$

(a) What is an informed searches?

(b) What is intelligent backtracking?

(c) Differentiate between forward chaining and backward chaining

(d) What is Fuzzy Logic?

(e) Write the inference rules in Propositional Logic

4. Answer the following (5 × 3 = 15)

(a) Write about Facts and Rules on prolog.

(b) Write about Unification algorithm.

(c) Write about conditional Planning.

(d) Bayes rule of uncertainty.

(e) How agents communicate among themselves?

5. Answer the following (5 × 3 = 15)

(a) Write about AND-OR graph.

(b) Compare LISP and PROLOG.

(c) What is reinforcement learning?

(d) What are the types of Agents?

(e) What are the components of an Expert system?

6. Answer the following (3 × 5 = 15)

(a) Solve 8 Puzzle problem using state space representation.

(b) Write about MinMax algorithm.

(c) Convert the following English statement to statements in first order logic

(i) Every boy or girl is a child.

(ii) Every child gets a doll or a train or a lump of coal.

(iii) No boy gets any doll.

(iv) No child who is good gets any lump of coal.

(v) Jack is a boy.

7. Write short notes on the following (3 × 5 = 15)

(a) Neural Network

(b) Stimulated annealing

v(c) Alpha-beta pruning



8. Answer the following

(a) Write few applications of AI (5)

(b) Consider the following predicates and proof (5+5=10)

(i) John like all kinds of food.

(ii) Apples are food.

(iii) Chicken is food.

(iv) Anything any one eats and is not killed by is food.

(v) Bill eats peanuts and is still alive.

(vi) Sue eats everything Bill eats.

From the above solve the following :

(A) Translate to predicate logic.

(B) Convert the formula into clause form.

9. Answer the following

(a) What is the use of heuristic Search? Explain heuristic for constraint satisfaction problem. (5+5=10)

(b) Write about AO*algorithm (5)

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