25/05/2019

Roll No. ..... Total Pages : 03

MCA/M-19 10516

ARTIFICIAL INTELLIGENCE

MCA-14-45(II)

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) What is the difference between $\rightarrow$ and $\leftrightarrow$ operators in logic ? Discuss using examples.

(b) What is universal instantiation rule in predicate logic ?

(c) What is the time and space complexities of depth first search ?

(d) Differentiate between Boolean logic AND, OR operators and fuzzy logic AND, OR operators.

(e) What is premature convergence to solution in genetic algorithm ?

(f) What is Unit Resolution ?

(g) What is Context Sensitive Grammar ?

(h) What are the limitations of bi-valued logic ?

Unit I

2. (a) What do you understand by Artificial Intelligence ? Differentiate between human intelligence and machine intelligence.

   (b) Differentiate between associative networks and conceptual graph using suitable examples.

3. (a) Discuss the following inference rules in FOPL :

   (i) Modus Ponen

   (ii) Chain Rule.

   (b) Convert the following statement into clausal form :

$$\forall \times \forall y(\exists z \mathrm{P}(x,z) \,\&\, \mathrm{P}(y,z)) \rightarrow \exists u\, \mathrm{Q}(x,y,u)$$

Unit II

4. (a) What do you understand by state space representation ? Discuss the difference between data-driven and goal-driven state space search strategies.

   (b) Write the A* algorithm and compare it with hill climbing search.

5. Differentiate between the following :

   (a) Alpha and beta pruning

   (b) Admissibility and monotonicity.

Unit III

6. (a) What is the advantage of keeping the knowledge base separate from control program in production systems ? Discuss.

   (b) What is Expert System ? What are its different applications ? Discuss.

7. Write notes on the following :

   (a) Belief based reasoning

   (b) Stanford certainty factor algebra.

Unit IV

8. (a) Define formal language and discuss in detail the Chomsky Hierarchy of formal language.

   (b) What do you understand by learning automata ? Discuss.

9. (a) What is the difference between rank selection and Roulette wheel selection in genetic algorithm ?

   (b) What are the problems in understanding natural languages ? Discuss.