

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 Ponens
 - (ii) Chain Rule.
- (b) Convert the following statement into clausal form :
$$\forall x \forall y (\exists z P(x, z) \& P(y, z)) \rightarrow \exists u Q(x, y, u)$$

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.