Total number of printed pages = 4

19/5th Sem/DCSE512

2021

ARTIFICIAL INTELLIGENCE

Full Marks – 100

Time – Three hours

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

Answer any *five* questions.

1. (a) Explain each term briefly : 2×5=10

   (i) Tautology

   (ii) CNF

   (iii) Rote learning

   (iv) Unification

   (v) Universal quantifier.

   (b) Differentiate between : 2×5=10

   (i) Propositional logic and Predicate logic.

   (ii) Breadth first search and Depth first search.

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(iii) Plateau and Local maximum.

(iv) Supervised and Unsupervised learning.

(v) Inductive and Deductive inference.

2. (a) Discuss the candidate elimination method with a suitable example. 10

(b) Prove that if (P(VQ) and (¬ P^R) is true, then (QVR) is also true. 5

(c) Some covid19 patients having diabetes have high risk. 5

3. (a) What is knowledge representation ? What is the rule of Forward and Backward Chaining in rule based knowledge representation ? Explain clearly. 2+2×4=10

(b) Prove whether P implication Q is a tautology or not. 5

(c) All CSE students are good in programming. 5

4. (a) What is the purpose of a heuristic function ? What is pure heuristic function ? 3+2=5

(b) How does best first search work ? What is the heuristic function for best first search ? 3+2=5

(c) Given that S and G are the sources and goal nodes whereas H(n) is the heuristic function estimating the distance of a node from the goal node as follows :

Node	A	B	C	D	E	F	H	I	S	G
H(n)	10	8	6	5	4	3	6	2	12	0

Note that, S is the parent of A&B, A is the parent of C&D, B is the parent of E&F, F is the parent of H&I and I is the parent of G. Apply best first search algorithm and show the iterative steps of the closed and the open lists to find the path of the solution. 10

5. Write short notes on any *four* of the following :

(a) Hill climbing

(b) Skolemization

(c) PROLOG

(d) Iterative deepening search

(e) Artificial neural network

(f) Machine learning. 5×4=20

6. (a) What is a General learning model ? Briefly explain the functions of the components of the General learning model. 2+8=10

(b) What is an Expert system ? Mention the characteristics of an expert system. Briefly explain the functions of each of the components of an expert system. 2+2+6=10

7. (a) Define A* algorithm. Does A* give optimal solution ? 4+2=6

(b) Consider a suitable example and write the iterative steps of open and closed lists of the A* algorithm. 10

(c) Mention the advantages and disadvantages of the A* algorithm. 4