CBCS SCHEME

USN | | | | | | | | | | |

17CS562

Fifth Semester B.E. Degree Examination, Jan./Feb. 2023
Artificial Intelligence

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define Artificial Intelligence. List and briefly discuss task domains of AI. **(06 Marks)**

b. What is production system? Compare Breadth-first search, Depth-first search and Heuristic search techniques. **(08 Marks)**

c. Consider water jug problem. Explain search tree and search graph programs. **(06 Marks)**

OR

2 a. Explain seven problem characteristics. **(08 Marks)**

b. Recalling Simple-Hill climbing and Steepest-Ascent Hill Climbing algorithms, explain, why these algorithms fail to find solution? List the ways to deal with. **(07 Marks)**

c. Demonstrate working of A* algorithm for the graph shown in Fig.Q2(c).

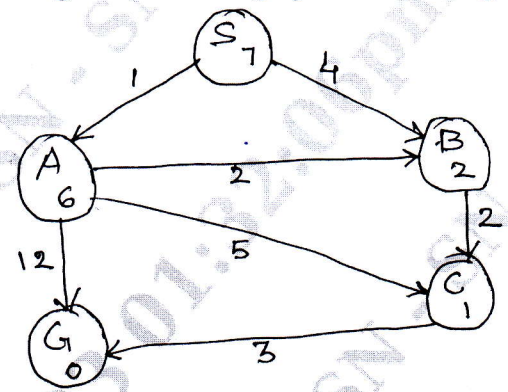

Fig.Q2(c) **(05 Marks)**

Module-2

3 a. List the approaches to knowledge representation. Explain. **(10 Marks)**

b. Consider the following sentences:

- Marcus was a man.
- Marcus was a Pompeian
- All Pompeians were Romans.
- Caesar was a ruler.
- All Romans were either loyal to Caesar or hated him.
- Everyone is loyal to someone.
- People only try to assassinate rulers they are not loyal to.
- Marcus tried to assassinate Caesar.
- All men are people.

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

(ii) Prove that "Marcus was not loyal to Caesar", using backward chaining. **(10 Marks)**

OR

4 a. Given Axioms in clause form:
(i) man (Marcus)
(ii) Pompeian (Marcus)
(iii) ¬Pompeian (x_1) ∨ Roman (x_1)
(iv) ruler (Caesar)
(v) ¬Roman (x_2) ∨ loyal to (x_2, Caesar) ∨ hate (x_2, Caesar)
(vi) loyal to (x_3, $f_1(x_3)$)
(vii) ¬man (x_4) ∨ ¬ ruler (y_1) ∨ ¬ tryassassinate (x_4, y_1) ∨ loyal to (x_4, y_1)
(viii) tryassassinate (Marcus, Caesar)
Prove: hate (Marcus, Caesar), using Resolution for Predicate logic. And, write a note on Resolution. **(12 Marks)**

b. Explain Forward reasoning and Backward reasoning. **(08 Marks)**

Module-3

5 a. Compare conventional reasoning with non-monotonic reasoning. **(06 Marks)**

b. Explain approaches of default reasoning. **(08 Marks)**

c. Write a note on Dempster-Shader theory. **(06 Marks)**

OR

6 a. Given the Bayesian network in Fig.Q6(a).

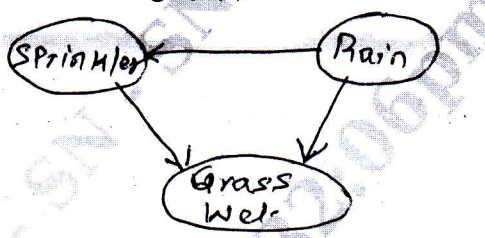

Fig.Q6(a)

Calculate P(G = T/R = T). The probabilities are given in Table Q6(a)(i), (ii) and (iii).

Table.Q6(a)(i)

Rain	
T	F
0.2	0.8

Table.Q6(a) (ii)

	Sprinkler	
Rain	T	F
F	0.4	0.6
T	0.01	0.99

Table.Q6(a) (iii)

		Grass wet	
Sprinkler	Rain	T	F
F	F	0.0	1.0
F	T	0.8	0.2
T	F	0.9	0.1
T	T	0.99	0.01

(10 Marks)

b. What is frame? Explain the representation of frames as sets and instance. **(10 Marks)**

Module-4

7 a. Write short notes on: (i) Conceptual Dependency (ii) Scripts **(10 Marks)**

b. Demonstrate minmax algorithm with α-β pruning for the tree shown in Fig.Q7(b).

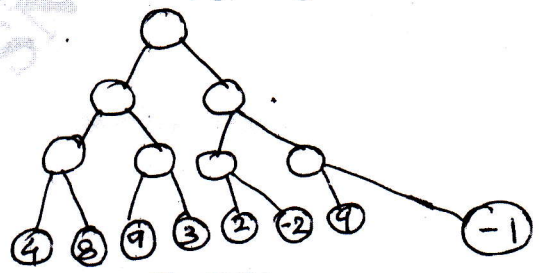

Fig.Q7(b) **(10 Marks)**

OR

8 a. What is Game Playing? Explain minmax search procedure, using example. **(10 Marks)**

b. Explain iterative depeaning algorithm. Use appropriate example. **(10 Marks)**

Module-5

9 a. Briefly explain the steps in natural language understanding. **(10 Marks)**

b. Explain: (i) Rote learning (ii) Learning by taking advice **(10 Marks)**

OR

10 a. For the given data in Table.Q10(a) learn the concept of "Japanese Economy Car".

	Origin	Mfr	Color	Decade	Type	Label
1	Japan	Honda	Blue	1980	Eco	+
2	Japan	Toyota	Green	1970	Sports	–
3	Japan	Toyota	Blue	1990	Eco	+
4	USA	Chrystar	Red	1980	Eco	–
5	Japan	Honda	White	1980	Eco	+

(10 Marks)

b. Explain expert system. Discuss the following:

(i) Representing domain knowledge

(ii) Interaction with expert system **(10 Marks)**

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