

Reg. No.

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B.E./ B. TECH.DEGREE EXAMINATIONS, MAY 2023

Sixth Semester

IT18601 – COMPUTATIONAL INTELLIGENCE

(Information Technology)

(Regulation 2018)

TIME:3 HOURS

MAX. MARKS: 100

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Analyze the problems and solve them using AI techniques .	5
CO 2	Infer knowledge for the problem represented in the language/framework using different AI methods.	4
CO 3	Apply data mining techniques to real-world problems.	4
CO 4	Design expert systems for various applications.	4
CO 5	Generate solutions to problems using advanced concepts of Computational Intelligence.	5

PART- A(10x2=20Marks)
(Answer all Questions)

Q.No	QUESTION	CO	RBT LEVEL
1.	Show with a simple example that A* is admissible in the case of overestimation	1	4
2.	Examine why Breadth first search is not suitable for AND-OR graph.	1	4
3.	Convert the following to predicate logic: No student can fool all the other students.	2	3
4.	State the difference between A* and AO* algorithm.	2	4
5.	How can decision tree models be avoided from overfitting?	3	2
6.	How is clustering different from classification?	3	4
7.	Why knowledge acquisition is considered as the most difficult step in knowledge engineering?	4	2
8.	List the difficulties involved in developing an expert system.	4	3
9.	State the difference between crisp set and fuzzy set.	5	4
10.	What is crossover and mutation in genetic algorithm?	5	2

PART- B (5x 14=70Marks)

Marks	CO	RBT LEVEL
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11. (a) (i) Analyze the 8 puzzle problem given below using heuristic method to achieve the goal state.

Initial State

2	3	4
8	6	1
7		5

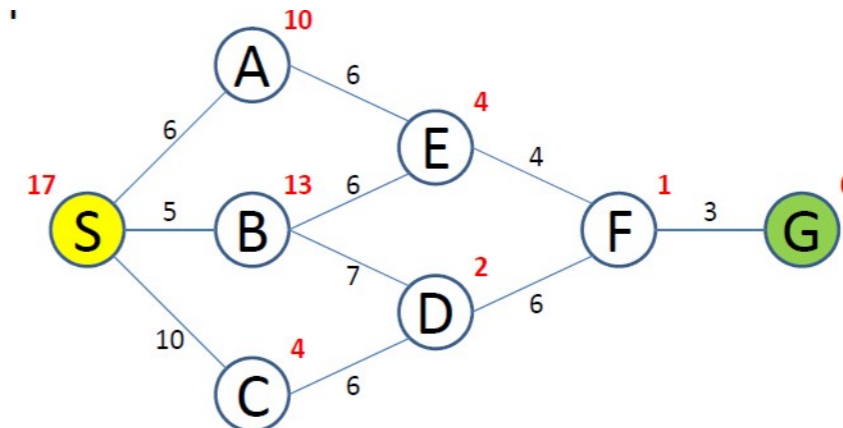
Goal State

1	2	3
8		4
7	6	5

- (ii) A water jug problem states “A milkman carries a full 12 litre container of milk. He needs to deliver exactly 6 litres. But the customer has only 8 and 5 litre jugs. Devise the production system for it.

(OR)

- (b) (i) Analyze the graph given below and find the most cost-effective path to reach the final state (G) from initial state(S) using A* Algorithm.



- (ii) Solve the crypt arithmetic problem by applying the constraint satisfaction strategy:

$$\begin{array}{r} P E A R \\ + N U T \\ \hline F R U I T \end{array}$$

12. (a) Consider the following facts: (14) 2 3
 F1: There are 500 employees in ABC company.
 F2: Employees earning more than Rs. 5000 pay tax.
 F3: John is a manager in ABC company.
 F4: Manager earns Rs. 10,000.

Convert the facts in predicate form to clauses and then prove by resolution: "John pays tax".

(OR)

(b) A knowledge base has the following facts: (14) 2 3

- Gita loves all types of clothes.
- Suits are clothes.
- Jackets are clothes.
- Anything any wear and isn't bad is clothes.
- Sita wears skirt and is good.
- Renu wears anything Sita wears.

Apply backward chaining and forward chaining to prove that "Gita Loves Kurtis".

13. (a) Illustrate numerosity and dimensionality reduction techniques in data mining with suitable examples. (14) 3 3

(OR)

(b) (i) Construct the Clustering Feature tree using BIRCH algorithm to the following 1-D dataset: {25,11,12,15,20,27,10,36,10,3,12,28} . (7) 3 3
 [Assume the Branching factor B=2 and Diameter Threshold D=5].

(ii) Apply K-Medoids algorithm using Manhattan distance to cluster the following dataset into 2 clusters: A1=(2,3), A2=(7,2), A3=(1,1), A4=(8,5), A5=(3,6), A6=(9,7). (7) 3 3

14. (a) Investigate how inferencing takes place in MYCIN expert system. (14) 4 3

(OR)

(b) Investigate the knowledge representation, knowledge acquisition process in XCON expert system. (14) 4 3

15. (a) Explain fuzzy rule based reasoning system in detail. (14) 5 2

(OR)

(b) Explain how learning takes place in a feed forward neural network with an example. (14) 5 2

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

Marks CO RBT LEVEL

16. Construct the FP-Tree and generate the pattern base for the following dataset assuming minimum support count=3. (10) 3 5

TID	Items
1	E,A,D,B
2	D,A,C,E,B
3	C,A,B,E
4	B,A,D
5	D
6	D,B
7	A,D,E
8	B,C
