Reg. No.															

B.Tech. DEGREE EXAMINATION, JANUARY 2024

Sixth Semester

18CSC305J – ARTIFICIAL INTELLIGENCE

(For the candidates admitted during the academic year 2020-2021 & 2021-2022)

Note:

(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours | Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

	Marks	BL	CO	PO

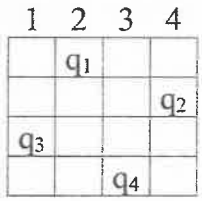
1. Solve the given crypt arithmetic puzzle and the values of A, B, C respectively

	A	A	
+	B	B	
C	B	C	

(A) 9, 1, 0 (B) 9, 2, 1
(C) 8, 1, 0 (D) 8, 9, 1

1 2 1 1

2. The following diagram is the representation of _____ in a N queens problems where N = 4.



(A) Initial state (B) Intermediate state
(C) Goal state (D) Path

1 2 1 1

3. Identify the device that perceive in an environment

(A) Actuators and sensors (B) Sensors and perceivers
(C) Perceivers (D) Transmitters and sensors

1 1 1 1

4. Pick the agent which makes decisions with outcomes of current and previous perceptions.

(A) Simple agent (B) Rational agent
(C) Model based agent (D) Learning agent and table driven agent

1 1 1 1

5. Pick the agent which makes decisions with outcomes with current and previous perceptions.

(A) Simple agent (B) Rational agent
(C) Model based agent (D) Learning agent and table driven agent

1 2 2 2

6. Your friend is in a building that has 9 floors and you want to locate him. Which search technique would you use?

(A) Depth first search (B) Depth limited search
(C) Iterative deepening (D) Breadth first search

1 2 2 2

7. Backtracking helps to

1	2	2	2

(A) Make the order of values
(B) Eliminate invalid search space
(C) Contains one or more constraint symbols
(D) Restrict the value of a single variable

8. For a perfect binary tree of BFS resists the nodes in following order: A, B, C, D, E, F, G then what will be order for DFS?

1	1	2	1

(A) A, B, C, D, E, F, G
(B) A, B, D, C, F, G, F
(C) A, B, D, E, E, G, F
(D) A, B, D, E, C, F, G

9. First order logic is based on objects, _____ and relations.

1	1	3	1

(A) Facts
(B) Functions
(C) Events
(D) Subjects

10. "Every cat is black or white", let C(x):x is a cat B(x):x is black; W(x):x is white. The corresponding predicate logic is

1	2	3	2

(A) $\forall x\left[C(x) \rightarrow \left[B(x) \wedge W(x)\right]\right]$
(B) $\forall x\left[C(x) \rightarrow \left[B(x)[\vee W(x)\right]\right]$
(C) $\forall x\left[C(x) \rightarrow \left[B(x) \vee W(x)\right]\right]$
(D) $\forall x\left[C(x) == \left[B(x) \vee W(x)\right]\right]$

11. Suppose that there are three propositions r("it is raining"), u("joe take his umbrella") and w("joe gets wets"). r→u (if it rains, then joe takes) u→not w ("if joe takes an umbrella, then he doesn't get wet") and not r→not w ("if is doesn't rain, joe doesn't get wet"). If it doesn't rain, then no body get wet. How this is represented when x is any one

1	2	3	2

(A) NOT r → not W(x)
(B) Not r → W(x)
(C) r → Not W(x)
(D) r → W(x)

12. Fuzzy logic is represented _____.

1	1	3	1

(A) As if-then-else rules
(B) As if-then rules
(C) Both as if-then-else and if-then rules
(D) Nested if

13. What are the major aspects which combines AI planning problem?

1	1	4	1

(A) Search dLogic
(B) Logic dKnowledge based system
(C) FOL dLogic
(D) Knowledge based system

14. Unsupervised learning is one in which _____.

1	1	4	1

(A) Input output pairs given
(B) Learning is done automatically
(C) Learning is done in semi supervised manner
(D) Only inputs are given

15. One of the main challenges of NLP is _____.

1	1	4	1

(A) Handling ambiguity of sentences
(B) Handling tokenization
(C) Handling POS-tagging
(D) Linguistics

16. How many types of quantifiers are available in AI?

1	1	4	1

(A) 6
(B) 2
(C) 3
(D) 4

17. In Tic-Tac-Toe problem the path cost can be calculated by

1	1	5	1

(A) Storage space
(B) Length of the path
(C) Number of possible moves
(D) Number of positions

18.	Find the informed search algorithm that does not backtrack and depends only on the current and the upcoming states. (A) A* algorithm (B) AO* algorithm (C) Hill climbing algorithm (D) Steepest ascent hill climbing	1	2	5	2
19.	Which step blogs to unification algorithm? (A) First order logic (B) Inference rule for quantifiers (C) Declarative and procedural knowledge (D) Indexing	1	2	5	2
20.	Relate if then state statements/ rules are with any one of the following options (A) Inference engine (B) Knowledge base (C) Explanation facility (D) Production rule	1	1	5	1

PART – B (5 × 4 = 20 Marks)
Answer **ANY FIVE** Questions

		Marks	BL	CO	PO
21.	Illustrate the types of agents with its architecture.	4	3	1	2
22.	Solve room colouring problem with an example using CSP.	4	4	1	2
23.	What is forward chaining? Explain it with an example.	4	1	2	1
24.	Discuss about the learning. Give some examples.	4	2	3	2
25.	What is Baye's theorem and give its applications.	4	2	3	2
26.	Illustrate how knowledge is represented in fuzzy based expert system.	4	1	4	1
27.	How is predicate logic helpful in knowledge representation and state the syntax of first order predicate logic?	4	1	5	1

PART – C (5 × 12 = 60 Marks)
Answer **ALL** Questions

		Marks	BL	CO	PO
28. a.i.	Define Constraint Satisfaction problems (CSP) and list the types of constraints.	6	1	1	1
ii.	Explain forward checking with four queens problems.	6	1	1	1
	(OR)				
b.	List the types of agents and illustrate each and every agent with neat block diagram.	12	1	1	1
29. a.	Explain alpha beta pruning with example specifying the need for the same. Give the condition in which pruning can be done.	12	2	2	2
	(OR)				
b.	Illustrate A^* algorithm with initial state and final state as given below. Initial state: 2 8 3 / 1 6 4 / 7 _ 5 Final state: 1 2 3 / 8 _ 4 / 7 6 5 Explain the steps involved.	12	2	2	1

30. a.i. Demonstrate the working of knowledge based agents and provide its architecture. 6 2 3 1

ii. Show how data mining techniques are used in uncertain knowledge reasoning. 6 2 3 1

(OR)

b.i. Show that the following premises: 6 3 3 2

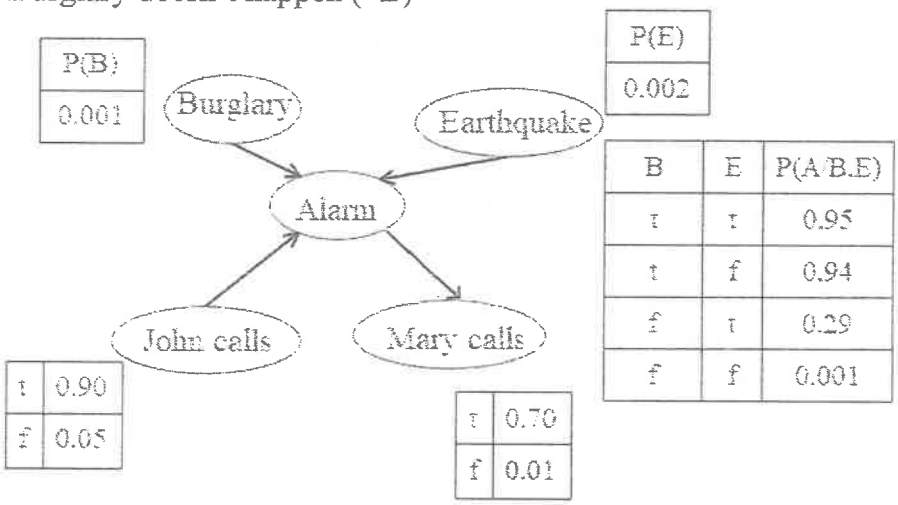
- A student in a section A of the course has not read the book
- Everyone is section A of the course passed the first exam

Imply the conclusion:

- Someone who passes the first exam has not read the book

ii. Calculate the probability that the alarm rings(A) given that" 6 3 3 2

- John calls (J)
- Mary calls (M)
- Earth quake doesn't happen (~F)
- Burglary doesn't happen (~B)



31. a. Write short notes on the following concepts with an example. 12 2 4 2

(i) Reinforcement learning
(ii) Adaptive learning
(iii) Multi agent based learning
(iv) Ensemble learning

(OR)

b. Describe the components of planning in detail. 12 2 4 1

32. a. Provide the step to solve an application by 12 2 5 2
Applying deep learning methods like Convolution Neural Network.

(OR)

b.i. Illustrate the working of frame-based expert system with an example. 6 2 5 1

ii. List and briefly outline the levels of natural language processing. 6 2 5 1

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