(Please Write Your Enrolment. No. Immediately)

Student Name...Vaibhav...

Enrolment No...23.....

Class Test- JAN. 2023

Programme: B. Tech(AI&DS, AI&ML)

Semester III

Paper Code : AIDS 207/AIML 207

Subject: Principles of Artificial Intelligence

Time: 1.5 hours

Max. Marks: 30

Note:

- **Q. No. 1 is compulsory.**
- **Attempt any two questions from the remaining questions.**
- **All Questions carry equal marks.**
- **Only scientific calculator is allowed.**

	Question 1.	Marks	CO	BL
1(a)	What do you mean by reasoning under uncertainty?	[2.5]	3	Understand
1(b)	Write a short note on learning process in Artificial Neural Networks?	[2.5]	3	Understand
1(c)	Write a short note on emerging trends in AI?	[2.5]	4	Understand
1(d)	How is expert system different from other conventional software?	[2.5]	4	Evaluate

	Question 2.	Marks	CO	BL
2(a)	Explain Bayesian Network or Dempster Shafer Theory?	[5]	3	Understand
2(b)	Explain different types of reasoning in AI with examples?	[5]	3	Understand

	Question 3.	Marks	CO	BL
3(a)	Formulate Min Max Algorithm?	[5]	4	Create
3(b)	Discuss the role of AI in game development?	[5]	4	Understand

	Question 4.	Marks	CO	BL
4(a)	State different types of learning with examples?	[5]	3	Remember
4(b)	Discuss in detail different applications of Artificial Intelligence?	[5]	4	Understand Analyze

(Please Write Your Enrolment. No. Immediately)

Student Name: Kanishk

Enrolment No: 23

Mid Term Examination- NOV. 2022

Programme: B. Tech(AI&DS, AI&ML, IIOT)

Semester III

Paper Code : AIDS 207/AIML 207/IIOT 207

Subject: Principles of Artificial Intelligence

Time: 1.5 hours

Max. Marks: 30

Note:

- **Q. No. 1 is compulsory.**
- **Attempt any two questions from the remaining questions.**
- **All Questions carry equal marks.**
- **Only scientific calculator is allowed.**

	Question 1.	Marks	CO	BL
1(a)	Discuss the role of AI techniques in easing our life.	[2.5]	1	Understand
1(b)	Explain A* algorithm?	[2.5]	1	Understand
1(c)	List laws of Algebra of proposition?	[2.5]	2	Remember
1(d)	Differentiate between procedural knowledge and declarative knowledge?	[2.5]	2	Analyze

	Question 2.	Marks	CO	BL
2(a)	Describe 8- Queen's puzzle problem or famous water jug problem?	[5]	1	Understand
2(b)	Write short notes on any two: (a)Hill Climbing (b) Heuristic Search (c) Means-End Analysis	[5]	1	Remember

	Question 3.	Marks	CO	BL
3(a)	How is unification used in resolution? Explain with examples.	[5]	2	Apply
3(b)	Compare forward chaining with backward chaining through an example?	[5]	2	Evaluate

	Question 4.	Marks	CO	BL
4(a)	Explain BFS and DFS? Demonstrate their role in traveling salesman problem?	[5]	1	Understand Apply
4(b)	Represent the following facts as predicates. (i) Some people like Football. (ii) Riya and Siya are sisters. (iii) Every student smiles. (iv) There is a Anaconda that is poisonous than all Pythons. (v) Someone walks and someone talks.	[5]	2	create

(Please write your Exam Roll No.) Exam Roll No. 22

END TERM EXAMINATION

THIRD SEMESTER [B.TECH] FEBRUARY 2023

Paper Code: AIDS/ AIML/ IOT207 **Subject: Principles of Artificial Intelligence**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions including Q.No.1 which is compulsory. Select one question from each unit. Assume missing data.

Q1 Compulsory to be attempted

a) Briefly describe AI techniques which evolved with the Turing Test. **(3)**

b) Explain how skolemization can be used to remove existential quantifiers? **(3)**

c) Differentiate between monotonic and non-monotonic reasoning. Also explain which one of these is suitable for theorem proving? **(3)**

d) Given blocks' world problem with four identical sized blocks (A, B, C and D) placed on table top as per the given initial state. There is a robotic arm which can move one block at a time to attain the required goal state. Explain how STRIPS operators can be used to perform the following operations for reaching from the given initial state to the desired goal state: STACK(C,D) and PUTDOWN(B) **(3)**

Initial State: ON(B,A) AND ONTABLE(A) AND ONTABLE (C) AND ONTABLE(D) AND ARMEMPTY

Goal State: ON(C,D) AND ONTABLE(A) AND ONTABLE (B) AND ONTABLE(D)

e) Given a scenario where two players are playing TIC-TAC-TOE game, which AI gaming algorithm can define the moves of both the players. Also write down the steps for the suggested algorithm. **(3)**

UNIT-I

Q2 a) With reference to the Water Jug Problem or N Queen's Problem, explain the following terms: **(8)**

i) State Space
ii) State Space Search
iii) Initial State and Goal State
iv) Production Rules and Control Strategy

P.T.O

b) Explain Best First Search algorithm. Also show the working of algorithm using Open Queue (Priority Queue) and Closed Queue by using suitable tree/graph structure. (7)

OR

Q3 a) Solve the following using crypt-arithmetic algorithm: (7)

```
  CROSS
+ ROADS
---------
 DANGER
```

b) State Monkey Banana Problem. Explain how the goal state of Monkey Banana Problem can be attained by using Means-End Analysis. (4+4)

c) Write the prolog code for Monkey Banana Problem.

UNIT-II

Q4 a) Differentiate between explicit and implicit form of knowledge. (3+4)

b) Explain with the help of suitable examples, following four inference rules used in predicate logic:
Universal Generalization
Universal Instantiation
Existential Introduction
Existential Instantiation

c) For the set of statements given below, prove by resolution that (8)
MARCUS HATED CAESAR.
1) Marcus was a man.
2) Marcus was Poempeian.
3) All Pompeians were Romans
4) Caesar was a ruler.
5) All Pompeians were either loyal to Caesar or hated him.
6) Every one is loyal to someone.
7) People only try to assassinate rulers they are not loyal to.
8) Marcus tried to assassinate Caesar.

OR

Q5 a) There are two medical practitioners. (3+3+1)
Medical practitioner 1 first confirms the symptoms, declares the diseases and then prescribes the medicines.
Medical practitioner 2 reviews medical history, guesses disease, tries to identify the relevant symptoms and in case disease and symptoms are aligned then prescribes the medicine.
i) Based on the given information, identify which of the reasoning (whether forward or backward) is being used by both the medical practitioners.
ii) Compare forward reasoning and backward reasoning.
iii) Also specify whether prolog uses forward reasoning or backward reasoning.

P.T.O.

b) Explain the following four inference rules for prepositional logic with the help of suitable examples:
i. Modus Ponens
ii. Modus Tollens
iii. Hypothetical Syllogism
iv. Disjunctive Syllogism

c) Define the terms tautology and contradiction. Also provide the suitable examples.

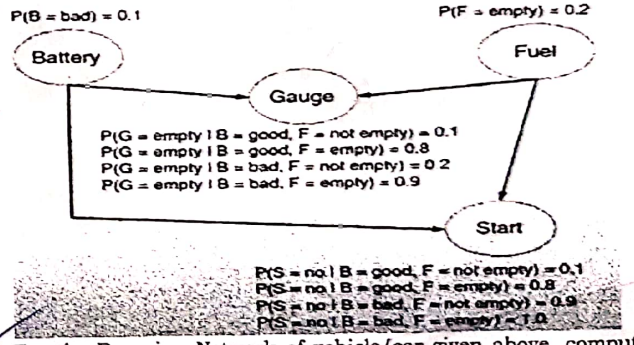
UNIT-III

Q6 a) Consider the mutually exclusive hypothesis represented by a set U={viral, measles, mumps, cough, conjunctivitis} in diagnostic system. (7)
Suppose, we have measure of belief function 'm1' and 'm2' based on the evidence of fever and headache respectively.
m1({viral, measles, mumps}) = 0.85
m2({viral, conjunctivitis}) = 0.6
Combine the given belief functions to generate m3 function using Dempster's Shafer Theory.

b) Explain how fuzzy logic differs from boolean logic? Also explain the following with respect to fuzzy logic by taking a suitable example: (8)
i. Fuzzy Set
ii. Membership Function
iii. Support of a Fuzzy Set
iv. Fuzzy Set Operations (Union, Intersection and Compliment)

OR

Q7 (7)



a) For the Bayesian Network of vehicle/car given above, compute the probabilities as asked.
In the given Bayesian Network, B represents battery status as good or bad, F represents status of Fuel Tank as empty or not empty, G represents status of Gauge as empty or not empty and S represents status of car as start or not start,
(i) Given the battery is good, fuel tank is empty and gauge is empty, compute the probability that the vehicle will start.

(ii) Given the battery is bad, fuel tank is empty and gauge not empty, compute the probability that vehicle will not start.

b) Differentiate the terms: Supervised Learning, Unsupervised Learning and Reinforcement learning by citing the real world examples. **(8)**

UNIT-IV

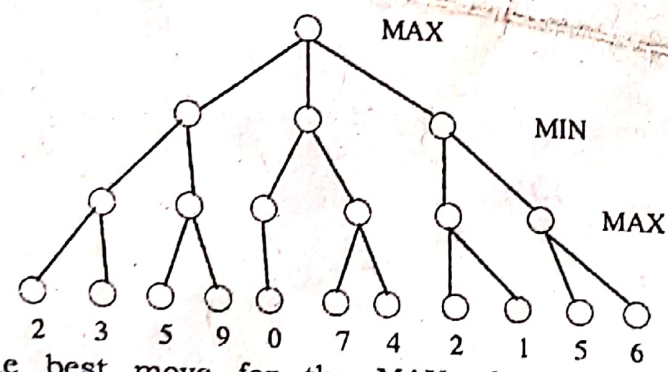
Q8 (a) We come across a number of AI based applications in our day to day lives. Pick up any application of your choice and explain where the following AI concepts are used in the application: **(8)**

(i) Natural Language Processing
(ii) Knowledge Representation Techniques
(iii) Searching Techniques
(iv) Reasoning Techniques

(b) Briefly describe the current state of art with respect to the usage of AI in Gaming. **(7)**

Q9 (a) Explain the significance of usage of Alpha-Beta Pruning Algorithm. Also write down the Alpha-Beta Pruning Algorithm. **(7)**

(b) For the partial search tree given below for a two player game: **(8)**



(i) Find the best move for the MAX player using the min-max procedure.

(ii) Using alpha-beta pruning shown which parts of the tree need not be searched. Indicate where the cut offs occur.

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AIDS/AIML/IOT-807
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Total No. of Pages: 1

Student Name: KASAK

Enrollment No: 02715611922

Mid-Term Examination – November 2023

Programme: B.Tech (AI&DS)

Semester: Third Semester

Paper Code: AIDS207

Paper Name: Principles of Artificial Intelligence

Time: 1hr 30 min

Max. Marks: 30

NOTE:

- Q.No.1 is compulsory
- Attempt any two more questions from remaining questions
- Some question has internal choice also
- All questions carry equal marks
- Only scientific calculator is allowed

Q.No.	Question 1	Max. Marks	CO(s)
Q.1			
1(a)	Explain with example- agent in a partially observable environment and agent in fully observable environment.	[2]	1
1(b)	What is a heuristic function?	[1]	1
1(c)	State clearly the difference between Propositional Logic and Predicate Logic.	[2]	2
1(d)	Compare and contrast Forward vs. Backward reasoning.	[2]	2
1(e)	Discuss how artificial intelligence is different from natural intelligence. What is the difference between knowledge representation and knowledge acquisition?	[3]	1,2
Q.2	**Question 2**		
2(a)	Consider try to solve the 8 puzzle using hill climbing. Can you find a heuristic function that makes this work? Make sure it works on the following example. Start state: 1 2 3 / 8 5 6 / 4 7 _ Final State: 1 2 3 / 4 5 6 / 7 8 _	[5]	1
2(b)	Explain constraint satisfaction problem. Solve the crypt arithmetic puzzle: SEND +MORE --------- MONEY	[5]	1
Q.3	**Question 3**		
3(a)	Are the statements, "it will not rain or snow" and "it will not rain and it will not snow" logically equivalent? Show with the help of truth table.	[6]	2
3(b)	Convert the following into First Order Logic: (i) John owns a dog (ii) Anyone who owns a rabbit hate anything that chases any rabbit.	[4]	2
Q.4	**Question 4**		
	Write Short Note on **any two**:		
4(a)	PROLOG (Logic Programming)	[5]	2
4(b)	Means-end Analysis	[5]	1
4(c)	Predicate Logic (resolution and unification)	[5]	2

(Please write your Enrolment No. Immediately) Enrollment No. 02715611922

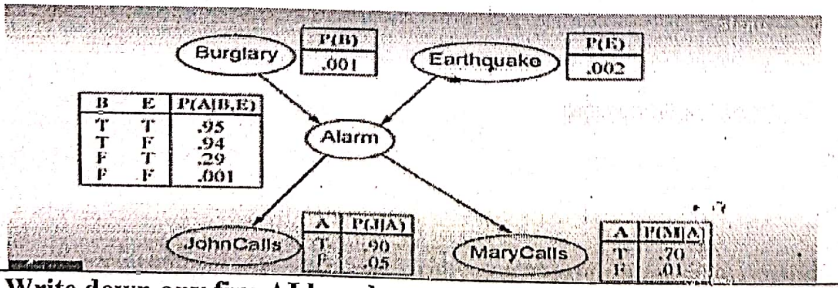
CLASS TEST

3rd Semester, December 2023

Paper Code: AIML207/AIDS207 **Subject Name: Principles of Artificial Intelligence**

Time: 1 Hour **Max. Mark: 30**

Note: Attempt Q. No. 1 which is compulsory and any two more questions from remaining questions.

Q. No	Question	Max. Marks	CO(s)
	Question 1		
1(a)	Differentiate between deductive and inductive reasoning.	2.5	3
1(b)	Define the terms: Fuzzy Set, Membership Function and Support Set.	2.5	3
1(c)	Define the terms: Belief and Plausibility with the help of a suitable example.	2.5	4
1(d)	Give a brief description of how can we apply adversial searching for TIC-TAC-TOE game?	2.5	4
	Question 2		
2(a)	Differentiate between supervised and unsupervised learning.	5	3
2(b)	Write down Preconditions, Additions and Deletions for the following operations using STRIPS language: (i) STACK(A,B) (ii) PUTDOWN(D) (iii) PICKUP(C) (iv) UNSTACK(A,B)	5	3
	Question 3		
3 (a)	Explain the working of Min-Max searching algorithm by taking a suitable example.	5	4
3 (b)	Explain the significance of alpha-beta cutoffs. Also write down alpha-beta pruning algorithm.	5	4
	Question 4		
4(a)	Explain Bayesian Networks. Also compute the probability that John calls for the given Bayesian Network:  	7	3
4 (b)	Write down any five AI based games and also mention AI concepts used in those games.	3	4