**MASTER OF COMPUTER APPLICATIONS (MCA-NEW)**

***MCS-224: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING***

**Block-1**

1. Compare Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI). **(June, 2024) 6 marks**
2. Explain Chinese room test as Criticism to Turing test, with suitable example. **(June, 2024) 5 marks**
3. Write steps to transform FOPL (First Order Predicate Logic) to PNF (Prenex Normal Form). Apply the steps to transform

∀x (Q(x)🡪 ∃x R (x, y)) to PNF. **(June, 2024) 6 marks**

1. Explain Min-Max search algorithm with suitable example. Give properties of MiniMax search algorithm. Also, write its advantages and disadvantages. **(June, 2024) 7 marks**
2. Write and explain Depth First Search (DFS) algorithm. Give time and space complexity of DFS algorithm. Also give its advantage and disadvantage. **(June, 2024) 7 marks**
3. Compare descriptive, predictive, and prescriptive analytics, performed under machine learning. **(June, 2024) 6 marks**
4. What do you understand by the term „Resolution‟ in AI? Discuss the utility of Resolution mechanism in AI. Apply it to conclude „Raman is mortal‟ from the knowledge given below: Every man is mortal (ii) Raman is a man. **(June, 2024) 6 marks**
5. Explain Turing test with suitable example**. (December, 2023) 5 marks**
6. Compare artificial intelligence, machine learning and deep learning. **(December, 2023) 6 marks**
7. What do you understand by state space in AI? What is its utility? Write production rules for state space representation of water jug problem. **(Dec, 2023) 7marks**
8. Write and explain Breadth First Search (BFS) algorithm. Discuss its space and time complexity. Also, give advantage and disadvantage of BFS algorithm. **(Dec, 2023) 7marks**
9. Differentiate between predicate and propositional logic. If P(x) → **“x is a rational number”** and Q(x)→ **“x is a real number”** then symbolize the following sentences:
   1. Every rational number is a real number
   2. Some real numbers are rational
   3. Not every real number is a rational number **5 marks**
10. What is Min-Max Search Strategy? Write MINIMAX algorithm. **(June,23) 5 marks**
11. Differentiate between informed search and uninformed search. Name one algorithm for each. **(June,23) 4 marks**
12. Describe the Modus Ponens and Modus Tollens as propositional rule of inference. **(June,23) 5 marks**
13. Explain Turing test, with the help of a block diagram. Also, discuss Chinese room test as criticism to Turing test. **(June,23) 10 marks**
14. What do you understand by State Space Search ? Explain the state space representation of Water-Jug Problem (WJP), given below :

**“Given two jugs of 5-gallon and 3-gallon, both of which do not have measuring indicators on them. The jugs can be filled with water with the help of any pump, any number of times.”**

The question is “how can you get 4 gallons of water in a 5-gallon jug?”. **(June,23) 10 marks**

1. Differentiate between the following:
   1. A\* and AO\* algorithm
   2. Depth first search and Breadth first search **(June,23) 10 marks**
2. Compare Artificial Intelligence (AI), Machine Learning and Deep Learning. **(Dec,22) 6 marks**
3. Briefly discuss the Adversarial search. Name the techniques used for adversarial search. **(Dec,22) 5 marks**
4. Write algorithm for BFS (Breadth-First Search). Write the time complexity and space complexity of BFS. **(Dec,22) 5 marks**
5. Obtain Conjunctive Normal Form (CNF) for the formula:

D 🡺 (A🡺 (B**^**C)) **(Dec,22) 5 marks**

1. Briefly discuss the following (give suitable example for each): (**Dec,22) 10 marks**
   1. Rote learning
   2. Supervised learning
   3. Unsupervised learning
   4. Delayed-Reinforcement learning
2. Briefly discuss the Min-Max Search Strategy. What are the properties of Minimax Algorithm? Also give advantages and disadvantages of Minimax search. (**Dec,22) 10 marks**
3. What is Iterative Deepening Depth First Search (IDDFS)? How is it different from Depth First Search? Give time and space complexities of IDDFS. Also give advantages and disadvantages of IDDFS. (**Dec,22) 10 marks**
4. Compare Narrow AI, General AI and Super AI. Give suitable example for each. (**Jun,22) 6 marks**
5. Briefly discuss the formulation of state space search, with a suitable example. (**Jun,22) 5 marks**
6. Write DFS (Depth-First Search) algorithm. Give one advantage and one disadvantage of DFS. (**Jun,22) 5 marks**
7. Obtain Disjunctive Normal Form for the well form formula given below: (**Jun,22) 5 marks**

~ (A → (~ B ^C))

1. What is Adversarial Search? How it is different from the normal search? Briefly discuss the types of adversarial search. (**Jun,22) 10 marks**
2. What is Best First Search? How is it different from greedy best first search? Give time complexity and space complexity of best first search. Also, give advantage and disadvantage of best first search. (**Jun,22) 10 marks**