Code No: R203105A **R20** SET - 1

III B. Tech I Semester Regular/Supplementary Examinations, December -2023
ARTIFICIAL INTELLIGENCE
(Common to CSE, IT)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. Illustrate in detail about the foundational concepts of artificial intelligence (AI) applications. [14M]

(OR)

2. Describe in detail about the various developments in artificial intelligence languages. [14M]

UNIT-II

3. Represent 8 puzzle problem in state space. And apply best first search to solve the problem. [14M]

(OR)

4. Consider the Crypt arithmetic problem [14M]

CROSS
+ROADS
DANGER

Constraints are

- Assign a decimal digit to each of the letters in such a way that the answer to the problem is correct.
- If the same letter is occurred more than once, it must be assigned the same digit each time.
- No two different letters may be assigned the same digit.

Give the complete Solution with clear steps of computation?

UNIT-III

5. Consider the following sentences [7+7]

- John likes all kinds of food
- Apples are food
- Chicken is food
- Anything anyone eats and isn't killed by is food
- Bil eats peanuts and is still alive
- Sue eats everything bill eats

a) Translate these sentences into predicate logic formulae.
b) Prove that john likes peanuts using resolution.

(OR)

6. Describe in detail about the natural deduction systems? [14M]

UNIT-IV

7. Give Semantic nets to describe the following: [2+2+2+2+3+3]
   a) Narayan is a writer
   b) Narayan lives in Bombay
   c) Ishwar is a teacher
   d) Ishwar lives in Bangalore
   e) Narayan sent a copy of his book to Ishwar
   f) Ishwar sent his thanks to Naryan

(OR)

|'''|'|'|''|''||'|||

8. Give a step-by-step script for going to the bank to withdraw money. [14M]

UNIT-V

9. Explain the process of knowledge acquisition and validation for expert systems. [14M]

(OR)

10. a) Compare and contrast expert systems Vs traditional systems. [7M]
    b) Illustrate in detail about the various tools used in building an expert system. [7M]

Code No: R203105A **R20** SET - 2

III B. Tech I Semester Regular/Supplementary Examinations, December -2023
ARTIFICIAL INTELLIGENCE
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Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1. Explain in detail about the characteristics and applications of intelligent agents. [14M]

(OR)

2. Consider the game of tic-tac-toe. Assume that X is the MAX player. Let the utility of a win for X be 10, a loss for X be -10 and a draw be 0. Given the game board board1 below where it is X's turn to play next, show the entire game tree. Mark the utilities of each terminal state and use the minimax algorithm to calculate the optimal move. [14M]

board1

X	O	X
O		O
	X	

UNIT-II

3. Consider the Crypt arithmetic problem [14M]

TWO
+TWO
FOUR

Constraints are

- Assign a decimal digit to each of the letters in such a way that the answer to the problem is correct.
- If the same letter is occurred more than once , it must be assigned the same digit each time.
- No two different letters may be assigned the same digit.

Give the complete Solution with clear steps of computation?

(OR)

4. a) List and explain the characteristics of Heuristic search? [7M]

   b) State and explain the conditions under which A* is admissible. [7M]

UNIT-III

5. Consider the following facts and represent them in predicate form [14M]

   a) F1 There are 500 employees in ABC Company
   b) F2 Employees earning more than Rs.5000 pay tax
   c) F3 John is a manager in ABC Company
   d) F4 Manager earns Rs 10,000

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

(OR)

6. Explain predicate calculus. Discuss inference rules to produce calculus expression. [14M]

|'''|'|'|''|''||'|||

UNIT-IV

7. Express the following sentences as semantics Net structure and conceptual dependencies. [14M]
   a) All those who code in C language are a programmer
   b) Sam gave Mary a box of Candy.

(OR)

8. Explain the knowledge representation of the restaurant using scripts. [14M]

UNIT-V

9. a) List and explain in detail about various features of expert system. [7M]
   b) Discuss in detail about truth maintenance systems.. [7M]

(OR)

10. Illustrate in detail about the various phases of building an expert system. [14M]

Code No: R203105A **R20** SET - 3

III B. Tech I Semester Regular/Supplementary Examinations, December -2023
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Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1. With the help of case studies. Explain how does AI application development benefit various industries, such as healthcare or finance. [14M]

(OR)

2. What are the emerging trends in AI applications, such as explainable AI or federated learning? Explain [14M]

UNIT-II

3. Illustrate the state space representation of a water-Jug problem. [14M]

(OR)

4. 8-queens problem seeks to place 8-queens in an 8x8 chessboard such that no twoqueens attack each other. Formulate this problem as a constrained satisfaction problem. [14M]

UNIT-III

5. Given the following information in a database [7+7]
   A1: If x is on top of y, y supports x.
   A2: If x is above y and they are touching each other, x is on top of y.
   A3: A cup is above a book.
   A4: A cup is touching a book.
   a) Translate statements A1 through A4 into clausal form.
   b) Show that the predicate support (book, cup) is true using resolution.

(OR)

6. Discuss with examples the scope and limitations of knowledge representation using Propositional logic and First Order Predicate logic [14M]

UNIT-IV

7. With an example explain the knowledge representation using semantic nets and frames. [14M]

(OR)

8. What is Knowledge representation? Explain various approaches to knowledge representation. [14M]

UNIT-V

9. Explain the use of expert system shells. What are the different ways to make the expert system effective? [14M]

(OR)

10. a) Describe the forward chaining and backward chaining inference strategies in expert system. [7M]
    b) List and explain the components of expert system and how they work together. [7M]

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Code No: R203105A **R20** SET - 4

III B. Tech I Semester Regular/Supplementary Examinations, December -2023
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Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1. Give the case studies to explain how do AI applications utilize predictive analytics and recommendation systems. [14M]

(OR)

2. What are the four basic types of agent programs in any intelligence system? Explain how can you convert them into learning agents. [14M]

UNIT-II

3. What do you mean by hill climbing search technique? Explain the term local maxima and plateau associated with it. [14M]

(OR)

4. Solve the following problem: [14M]
You are given two jugs, a 4-gallon one and a 3-gallon one, a pump which has unlimited water which you can use to fill the jug, and the ground on which water may be poured. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water in the 4-gallon jug?

UNIT-III

5. Express the following sentences in predicate logic formulae. [14M]
All people who are not poor and are smart and happy. Those people who read are notstupid. Many can read and is wealthy. Happy people have exciting lives. Anybody who iswealthy is not poor. John is wealthy but not happy. A smart person is not stupid.
(a) Convert the formulae into clausal form.
(b)Use resolution/reputation to answer the query
"Can anybody be found with an exciting life?"

(OR)

6. Describe in detail about the concept of axiomatic system with a suitable example. [14M]

UNIT-IV

7. Give an example to explain the conceptual dependency theory in detail? [14M]

(OR)

8. Explain in detail about the extended semantic network for knowledge representation? [14M]

UNIT-V

9. With a neat sketch explain the architecture of expert system? [14M]

(OR)

10. Explain the concept of rule-based reasoning and how is it used in expert systems? [14M]

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