



**B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023**

(Regulation 2018)

Fifth Semester

**INFORMATION TECHNOLOGY**

U18ITE0001: Artificial Intelligence

**COURSE OUTCOMES**

**CO1:** Demonstrate the awareness of intelligent agents and problem solving using different search algorithms

**CO2:** Interpret the use of different knowledge representation methods.

**CO3:** Make use of uncertain knowledge for planning and reasoning in AI applications.

**CO4:** Explain the basics of decision making.

**CO5:** Apply the knowledge of machine learning methods in AI applications.

**Time: Three Hours**

Maximum Marks: 100

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

1. What do you mean by turing test? CO1 [K<sub>2</sub>]
2. Give the PEAS description for an automated taxi. CO1 [K<sub>3</sub>]
3. What are the drawbacks of propositional logic? CO2 [K<sub>2</sub>]
4. For the given sentence “All Pomprians were Romans” write a well formed formula in predicate logic. CO2 [K<sub>3</sub>]
5. Compare STRIPS and ADL languages for representing planning problems. CO3 [K<sub>3</sub>]
6. Write the Bayes rule. CO3 [K<sub>2</sub>]
7. Identify and list some causes of uncertainty. CO4 [K<sub>2</sub>]
8. Draw the markov chain state transition diagram for the following data CO4 [K<sub>3</sub>]

Current State	Next State	Transition Probability
Cloudy	Rainy	0.6
Rainy	Rainy	0.2
Sunny	Cloudy	0.1
Rainy	Sunny	0.1
9. Compare exploration with exploitation. CO5 [K<sub>2</sub>]
10. Compare supervised, unsupervised and reinforcement learning algorithms CO5 [K<sub>2</sub>]

**Answer any FIVE Questions:-**  
**PART B (5 x 16 = 80 Marks)**  
**(Answer not more than 400 words)**

11. a) Explain in detail about the structure and types of agent programs. 8 CO1 [K<sub>2</sub>]  
 b) Explain any two informed search strategies with example. 8 CO1 [K<sub>2</sub>]
12. a) Explain the inference rules with quantifiers in first order logic. 8 CO2 [K<sub>2</sub>]  
 b) Using backward chaining, prove the following 8 CO2 [K<sub>3</sub>]  
 Statements: As per the law, it is a crime for an American to sell weapons to hostile nations. Country A, an enemy of America, has some missiles, and all the missiles were sold to it by Robert, who is an American citizen.  
 Conclusion: Robert is criminal.
13. a) List the planning steps in Air cargo transport problem and apply ADL to describe the problem domain. 8 CO3 [K<sub>3</sub>]  
 b) Construct planning graph for the “have cake and eat cake too” problem and explain. 8 CO3 [K<sub>3</sub>]
14. a) What do you mean by constraint satisfaction problem? Explain with any one example. 8 CO1 [K<sub>2</sub>]  
 b) Write the steps in the resolution. Using resolution prove the following 8 CO2 [K<sub>3</sub>]
- | Prove R |                   |
|---------|-------------------|
| 1       | $P \vee Q$        |
| 2       | $P \rightarrow R$ |
| 3       | $Q \rightarrow R$ |
15. a) Explain in detail about the axioms of utility theory. 8 CO4 [K<sub>2</sub>]  
 b) What are the two methods available to compute the optimal policy? Explain any one method in detail. 8 CO4 [K<sub>2</sub>]
16. a) Explain in detail about Q-Learning algorithm with example. 8 CO5 [K<sub>2</sub>]  
 b) Explain in detail about decision tree algorithm with example. 8 CO5 [K<sub>2</sub>]

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