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SDM Institute of Technology, Ujire

III Internal Assessment Test (March 2024)

Principles of Artificial Intelligence (21AI54)

Class: V Sem AD **Time: 90 minutes** **Max. Marks: 40**

Each Full question carries 8 Marks. Answer ONE full question from each Part.

Note: Missing data can be assumed suitably

		PART – A	Marks	Cos	RBT Level
1.	**(a)**	With example explain the following components of FOL: Objects, Relations and Functions. List the Basic Elements of FOL and give examples for each.	8	CO3	L2
		OR			
2.	**(a)**	Discuss the following components of Syntax and Semantics of FOL with examples: *Models, Symbols and Interpretations, Terms, Atomic Sentences, Complex Sentence, Quantifiers, Equality and Data base Semantics*	8	CO3	L2
		PART – B			
3.	**(a)**	What are Nested Quantifiers and Discuss why Order of Nested Quantifiers is Crucial? Write FOL Statements for the following using nested quantifiers: • Everyone dislikes Parsnips • Everybody loves somebody • There is someone who is loved by everyone • There is no one who does not like ice cream • For every natural number, there exists a prime number greater than it • For every x, there exists a y such that the property P(x, y) holds. • There exists an x such that for every y, the property P(x,y) holds.	8	CO3	L3
		OR			
4.	**(a)**	Write a FOL statements for the following: **1.** One's mother is one's female parent. **2.** One's husband is one's male spouse. **3.** Male and female are disjoint categories. **4.** Parent and child are inverse relations. **5.** A grandparent is a parent of one's parent. **6.** A sibling is another child of one's parents. **7.** Siblinghood is a symmetric relationship. **8.** King John has a crown on his head.	8	CO3	L3
		PART – C			
5.	**(a)**	Discuss and compare the Following with examples **1.** Assertions and queries in first-order logic **2.** Representing Numbers and List in FOL	8	CO3	L3
		OR			
6.	**(a)**	Design Algorithm for the following of FOL a. Unification in FOL b. Forward Chaining in FOL	8	CO3	L3

		PART – D			
7.	**(a)**	Design a Agent function that uses decision theory to select actions. Explain the following with examples **a.** Probability Model **b.** Unconditional and Conditional probability **c.** Product Rule	8	CO4	L2
		OR			
8.	**(a)**	Discuss with example the following: **a.** Inference using Full Joint Distribution **b.** Conditioning **c.** Normalization **d.** Independence	8	CO4	L2
		PART – E			
9.	**(a)**	Discuss the Kolmogorov's axioms. State Bayes Rule and apply Bayes Rule to any Simple diagnostic case with combining available evidence.	8	CO4	L3
		OR			
10.	**(a)**	Discuss the Wumpus World using Probability concepts like full joint distributions, conditional independence and product rule. Also prove that the squares [1,3] and [3,1] of Wumpus world containing a pit is of 31% probability.	8	CO4	L3