USN | | | | | | | | | | |

SDM Institute of Technology, Ujire

Department of CSE

II Internal Assessment Test (December 2024)

Artificial Intelligence (BCS515B)

Class: V Sem **Time: 60 minutes** **Max. Marks: 25**

Answer ONE full question from each Part.

Note: Missing data can be assumed suitably

		Marks	COs	RBT Level
	PART – A			
1a	Explain the key elements and components of Propositional Logic. Provide the syntax and BNF grammar for Propositional Logic, and illustrate their significance in formal reasoning systems.	6	CO3	L3
1b	Explain the Wumpus World environment and provide its PEAS (Performance measure, Environment, Actuators, Sensors) description, highlighting the role of each component in the context of intelligent agent design.	4	CO3	L3
	OR			
2a	Translate the following English sentences into First-Order Logic (FOL) expressions: **1.** The Barber of Seville shaves all men who do not shave themselves. **2.** There are at least two mountains in England. **3.** There are exactly two coins in the box. **4.** The largest coin in the box is a quarter. **5.** No mountain is higher than itself. **6.** All students get good grades if they study. Provide the FOL representations and explain how the formalization captures the meaning of each sentence.	6	CO4	L3
2b	Explain the syntax of First-Order Logic with equality, as specified in Backus-Naur Form (BNF). Illustrate how the BNF rules are applied to define valid expressions in this logic system.	4	CO4	L3
	PART – B			
3a	Explain how Set axioms are represented in First-Order Logic (FOL). Provide examples of formalizing set-theoretic concepts and axioms using FOL, and discuss their significance in formal systems.	6	CO4	L3
3b	Explain the Forward Chaining algorithm, providing a detailed example of its application. Discuss the steps involved in the algorithm and how it is used for reasoning in rule-based systems.	4	CO4	L3
	OR			
4a	Describe the various steps involved in Knowledge Engineering projects, using the example of an electronic circuit (specifically, a 1-bit full adder). Illustrate how each step is applied to model, analyze, and represent knowledge in the context of this example.	6	CO4	L3
4b	Illustrate the steps involved in resolving First-Order Logic (FOL) statements. Provide clear examples to demonstrate how resolution is used to derive conclusions from FOL expressions, highlighting key techniques and strategies.	4	CO4	L3
	PART-C			

5a	Define Classical Planning and design a classical planning problem using PDDL (Planning Domain Definition Language) with a detailed schema. Provide a solution plan for the **Air Cargo Transport problem**, explaining each component of the PDDL description and how it contributes to the overall plan.	5	CO5	L3
	OR			
5b	Provide five examples from Classical Planning that demonstrate how states are represented as conjunctions of fluents. Explain each example by illustrating how the fluents are used to describe the state of the system in a planning problem.	5	CO5	L3

****