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MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

IV SEMESTER B.TECH. COMPUTER SCIENCE & ENGINEERING (AI&ML) END SEMESTER EXAMINATION, MAY 2023

SUBJECT: ARTIFICIAL INTELLIGENCE [CSE 2271] REVISED CREDIT SYSTEM --/05/2023

Time: 3 Hours

MAX. MARKS: 50M

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitably assumed.

1A	Compare and contrast the following four approaches to define Artificial	(4M)	CO1
•	"Thinking Humanly"		
	"Thinking Rationally"		
	"Acting Humanly"		
	"Acting Rationally"		
1B	Design an automated taxi driver agent as model based agent and goal	(4M)	CO2
•	based agents. Discuss the model capabilities along with suitable		
	pseudocodes.		
1C	Consider an artificial intelligence system that has 3 agents namely (Ag1)	(2M)	CO2
•	Face Detector, (Ag2) Face Tracker, and (Ag3) Manager. The objective		
	of Ag1 is to detect the face of any human, Ag2 is to track the face even		
	when the person is moving, and Ag3 is to compare the detected and		
	tracked face with some AI algorithms and grant access or deny access		
	also maintain logs.		
	To design the above agent, describe the PEAS properties of Ag1, Ag2		
	and Ag3.		
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2A	Consider the following map of "Romania". Find the city "Bucharest"	(4M)	CO3
•	while you are at "Arad" using Breadth First Search and Depth First		
	Search algorithms. Show the tree generation steps along with the queue		
	and visited nodes list updates for every step.		





4B .	The diagram describes digital circuit C1, purporting to be a one-bit full adder. The first two inputs are the two bits to be added, and the third input is a carry bit. The first output is the sum, and the second output is a carry bit for the next adder. The circuit contains two XOR gates( $XI,X2$ ), two AND gates ( $AI,A2$ ), and one OR gate( $OI$ ). For a given digital circuit, analyze the seven-step process for knowledge engineering with appropriate predicates.	(4M)	CO4
	Figure 4D		
4C	<b>Figure</b> 4D Demonstrate how the exhaustive decomposition of a set can be defined	(2M)	CO4
	mathematically, and what the relationship is between an exhaustive		0.04
	decomposition and a partition.		
5A	Demonstrate the main challenges of using propositional logic for	(4M)	CO4
•	uncertain reasoning in diagnosing a dental patient's toothache. Justify the		
	reasons why the propositional logic rules for diagnosing a dental patient's toothache fail		
5B	i) Describe the concept of a full joint distribution in uncertain reasoning?	( <b>4M</b> )	CO5
•	ii) Below is an example of a full joint distribution for the toothache, cavity, and catch worlds, and it describes the presence or absence of cavities in a patient with a toothache. The probabilities in the table represent the likelihood of each possible combination of the variables. Computer conditional probabilities $P(cavity   toothache)$ and $P(\neg cavity   toothache)$ using Bayes Theorem.		
	toothache ¬toothache		
	Catch ¬ Catch Catch ¬ Catch		
	Cavity 0.20 0.10 0.5 0.25		
	¬Cavity 0.30 0.15 0.10 0.35		
	Table 5B		
5C	Explain independence probability with an example?	(2M)	CO5