

USN

--	--	--	--	--	--	--	--	--	--

RV COLLEGE OF ENGINEERING®
 (An Autonomous Institution affiliated to VTU)
 V Semester B. E. Examinations Nov/Dec-19

Computer Science and Engineering
ARTIFICIAL INTELLIGENCE (ELECTIVE)

*Time: 03 Hours**Maximum Marks: 100**Instructions to candidates:*

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6

PART-A

1	1.1	Write the <i>PEAS</i> description of the task environment for an automated taxi.	02																				
	1.2	Write recursive function for depth-limited search.	02																				
	1.3	Write any two heuristic functions to solve 8-puzzle problem.	02																				
	1.4	Write four components used to define a game as a search problem.	02																				
	1.5	Define Entailment. Give an example.	02																				
	1.6	Give suitable examples for following using first order logic: a) Atomic sentence, b) Complex sentence, c) Quantifiers.	02																				
	1.7	Write the rule of generalized Modus Ponens, how it is related to Modus Ponens?	02																				
	1.8	When does overfitting occurs during learning?	02																				
	1.9	Given a full joint distribution for the toothache cavity, catch world. <table border="1"><tr><td></td><td colspan="2"><i>Toothache</i></td><td colspan="2">\neg<i>Toothache</i></td></tr><tr><td></td><td><i>catch</i></td><td>\neg<i>catch</i></td><td><i>catch</i></td><td>\neg<i>catch</i></td></tr><tr><td><i>Cavity</i></td><td>0.108</td><td>0.012</td><td>0.072</td><td>0.008</td></tr><tr><td>\neg<i>Cavity</i></td><td>0.016</td><td>0.064</td><td>0.144</td><td>0.576</td></tr></table>		<i>Toothache</i>		\neg <i>Toothache</i>			<i>catch</i>	\neg <i>catch</i>	<i>catch</i>	\neg <i>catch</i>	<i>Cavity</i>	0.108	0.012	0.072	0.008	\neg <i>Cavity</i>	0.016	0.064	0.144	0.576	
		<i>Toothache</i>		\neg <i>Toothache</i>																			
	<i>catch</i>	\neg <i>catch</i>	<i>catch</i>	\neg <i>catch</i>																			
<i>Cavity</i>	0.108	0.012	0.072	0.008																			
\neg <i>Cavity</i>	0.016	0.064	0.144	0.576																			
	a) Find $P(\text{cavity})$ b) Find $P(\neg \text{cavity}) \text{Toothache})$	02																					
1.10	Propose a problem statement for application of AI in industrial automation or healthcare domain.	02																					

PART-B

2	a	Give the type of task environments for the following and discuss your answer.	
		i) Automated taxi agent. ii) Agent which spots defective parts.	05
	b	Write a schematic diagram for model-based reflex agent, function, and an use case.	06
	c	Explain in detail the working of search trees.	05

<p>3</p> <p>a</p> <p>b</p> <p>c</p>	<p>Explain the working of greedy best-first search technique. Give an example and its drawback.</p> <p>Construct a relaxed problem for solving 8-puzzle and give the role of pattern databases.</p> <p>State constraint satisfaction problem. Discuss the modeling of Sudoku as a constraint satisfaction problem.</p>	<p>05</p> <p>05</p> <p>06</p>
OR		
<p>4</p> <p>a</p> <p>b</p> <p>c</p>	<p>Write the algorithm for recursive best-first search, and give its drawback.</p> <p>Compare online search problems with offline search problems. Discuss the working of online search agents.</p> <p>State a game as a search problems. Given a two-ply game tree, perform Alpha –Beta pruning.</p>	<p>05</p> <p>05</p>
		<p>06</p>
<p>5</p> <p>a</p> <p>b</p> <p>c</p>	<p>Write the following in first order logic:</p> <ol style="list-style-type: none"> Some students of <i>DM</i> course has cleared <i>JEE</i> main and rest cleared <i>SAT</i>. Something that is white is not always milk, whereas the milk is always white. There exists a subset of students in <i>DM</i> class having i-phones. <p>Discuss the following:</p> <ol style="list-style-type: none"> Logical equivalence <i>AND</i> Elimination <p>Explain the steps used in knowledge engineering process.</p>	<p>06</p> <p>04</p> <p>06</p>
OR		
<p>6</p> <p>a</p> <p>b</p> <p>c</p>	<p>Translate the following into first order logic:</p> <ol style="list-style-type: none"> No yellow frogs are edible Every bag contains at least one coin. Two regions overlap just in case they share a common part. <p>Prove the resolution yields a complete inference algorithm by considering Wumpus world problems.</p> <p>Differentiate forward chaining with backward chaining. Illustrate the working of forward chaining by considering the example of Colonel West.</p>	<p>06</p> <p>04</p> <p>06</p>

7	a	Give the principle of working of decision trees.	04
	b	Dr.XYZ has a patient who is very sick. Without further treatment, this patient will die in about 3 months. The only treatment alternative is a risky operation. The patient is expected to live about 1 year if he survives the operation, however the probability that the patient will not survive the operation is 0.3. Draw the decision tree.	04
	c	Discuss the following: i) Ensemble learning ii) Reinforcement learning.	08
8	a	State Baye's rule. On an airport all passenger are checked carefully. Let T with $t \in \{0,1\}$ be the random variable indicating whether somebody is a terrorist or not. A true terrorist will be arrested with the probability 0.98 and non-terrorist will be arrested with probability 0.001. One in hundred thousand passengers is a terrorist. What is the probability that an arrested person actually a terrorist?	06
	b	Write full specification of Bayesian network. Demonstrate the process of finding probability of occurrence of an event by considering suitable example.	06
	c	Under which situation, dealing with uncertainty arises in AI.	04