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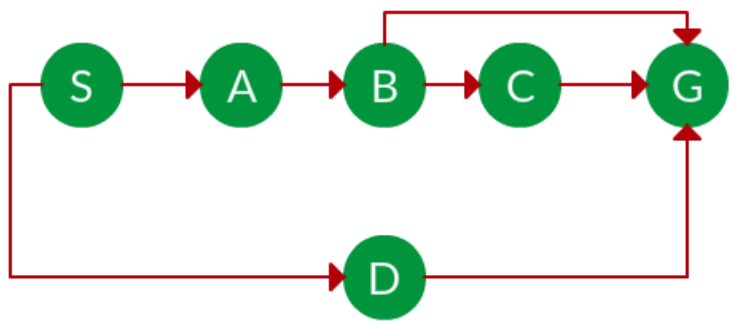
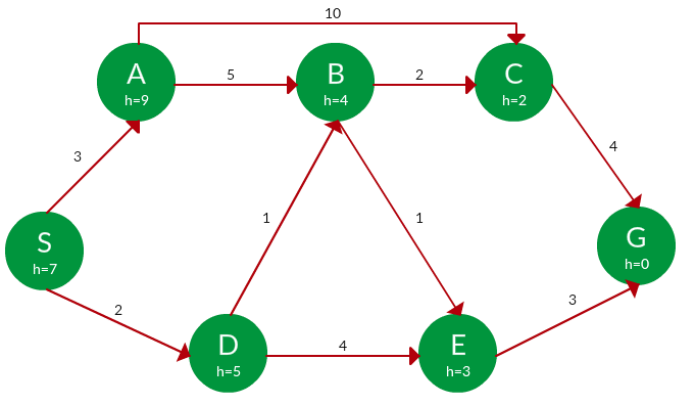
RV COLLEGE OF ENGINEERING
Autonomous Institution affiliated to VTU
DEPARTMENT…OF COMPUTER SCIENCE & ENGINEERING.
I Semester M.Tech (CSE/CNE)
June-2023 Examinations

Artificial Intelligence and Machine Learning
(2022 SCHEME)
(Non-Integrated Course)

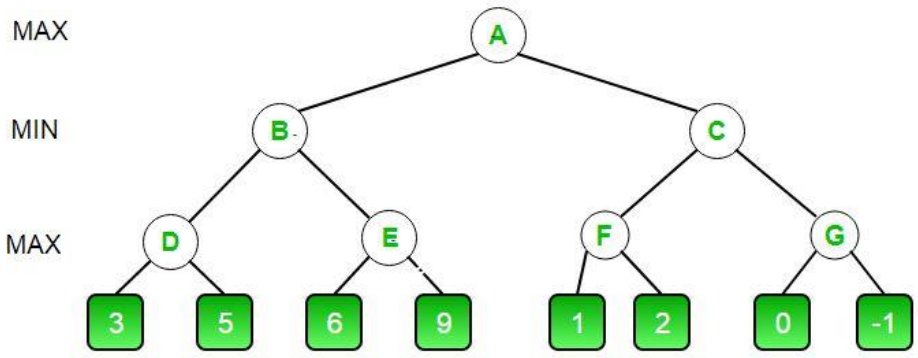
Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Each unit consists of two questions of 20 marks each.
2. Answer FIVE full questions selecting one from each unit (1 to 5).

		UNIT-I	
1	a	Define an agent in AI? List different types of agents ? Illustrate with examples functions of an artificial agent (8)	20
	b	Discuss the steps employed in AI to identify a problem? Illustrate types of searching strategies employed in resolving a AI problem with examples. (8)	
	c	Implement solution would DFS find to move from node S to node G if run on the graph below? (4) 	
		OR	
2	a	Find the path to reach from S to G using A* search. (8) 	
	b	"Agents can be grouped into five classes based on their degree of perceived intelligence and capability :" Justify by giving different class of agents with	

		relevant sketches	(8)	
	c	Describe briefly Informed(Heuristic) Search Strategies?	(4)	

		UNIT-II		
3	a	Define back tracking? Discuss types of back tracking algorithms used in AI? Illustrate with one examples	(8)	20
	b	With a neat sketch represent types of knowledge used in designing AI systems?	(8)	
	c	With an example discuss briefly Bayesian belief network?	(4)	
		OR		
4	a	Discuss various approaches used in knowledge representation	(8)	
	b	Implement Alpha-beta pruning for the below example 	(8)	
	c	Define probabilistic reasoning with examples	(4)	

		UNIT-III		
5	a	With an example briefly discuss the decision tree? List and explain the steps used in ID3 algorithm with decision tree concept	(8)	20
	b	Discuss the candidate elimination algorithm used in Machine learning with examples	(8)	
	c	Conceptualize the ideology in designing the learning systems	(4)	
		OR		
6	a	Construct a decision tree for the following example/		

		<table><tr><th>Day</th><th>Weather</th><th>Temperature</th><th>Humidity</th><th>Wind</th><th>Play?</th></tr><tr><td>1</td><td>Sunny</td><td>Hot</td><td>High</td><td>Weak</td><td>No</td></tr><tr><td>2</td><td>Cloudy</td><td>Hot</td><td>High</td><td>Weak</td><td>Yes</td></tr><tr><td>3</td><td>Sunny</td><td>Mild</td><td>Normal</td><td>Strong</td><td>Yes</td></tr><tr><td>4</td><td>Cloudy</td><td>Mild</td><td>High</td><td>Strong</td><td>Yes</td></tr><tr><td>5</td><td>Rainy</td><td>Mild</td><td>High</td><td>Strong</td><td>No</td></tr><tr><td>6</td><td>Rainy</td><td>Cool</td><td>Normal</td><td>Strong</td><td>No</td></tr><tr><td>7</td><td>Rainy</td><td>Mild</td><td>High</td><td>Weak</td><td>Yes</td></tr><tr><td>8</td><td>Sunny</td><td>Hot</td><td>High</td><td>Strong</td><td>No</td></tr><tr><td>9</td><td>Cloudy</td><td>Hot</td><td>Normal</td><td>Weak</td><td>Yes</td></tr><tr><td>10</td><td>Rainy</td><td>Mild</td><td>High</td><td>Strong</td><td>No</td></tr></table> How do you check the impurity of the feature 1, feature2, and feature 3, using entropy? (8)	
	b	Illustrate the concept of inductive bias using candidate elimination algorithm (8)	
	c	Discuss briefly the perspectives and issues in concept learning? (4)	

		UNIT-IV	
7	a	**"Bayes' theorem** basis for most modern AI systems for **probabilistic inference**" Justify the statement with definition and corresponding equations. (8)	20
	b	Discuss the salient features of EM- Algorithm (8)	
	c	From a standard deck of playing cards, a single card is drawn. The probability that the card is king is 4/52, then calculate posterior probability P(King|Face), which means the drawn face card is a king card. (4)	
		OR	
8	a	Illustrate the concept of Maximum likelihood estimation (MLE) using Bayesian networks (8)	
	b	Discuss in detail Naïve Bayes Classifier with examples (8)	
	c	Determine the probability that a patient has diseases meningitis with a stiff neck? (4) **Given Data:** A doctor is aware that disease meningitis causes a patient to have a stiff neck, and it occurs 80% of the time. He is also aware of some more facts, which are given as follows: • The Known probability that a patient has meningitis disease is 1/30,000. • The Known probability that a patient has a stiff neck is 2%.	

		UNIT-V	
9	a	Define Reinforcement learning technique? Briefly discuss the advantages of this technique with suitable example (8)	20
	b	List and explain briefly K- Nearest neighbor algorithm with example (8)	
	c	Discuss briefly the concept of locally weighted regression? (4)	
		OR	
10	a	Illustrate Q-learning technique with an example (8)	
	b	Discuss the concept of instant based learning with an example (8)	
	c	Define temporal learning? Give examples (4)	

Signature of Scrutinizer: Signature of Chairman

Name: Name: