U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

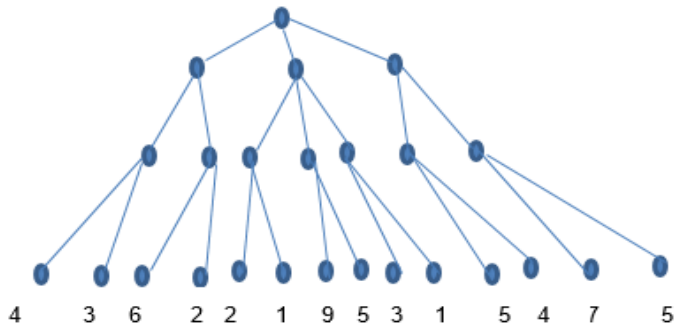
Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

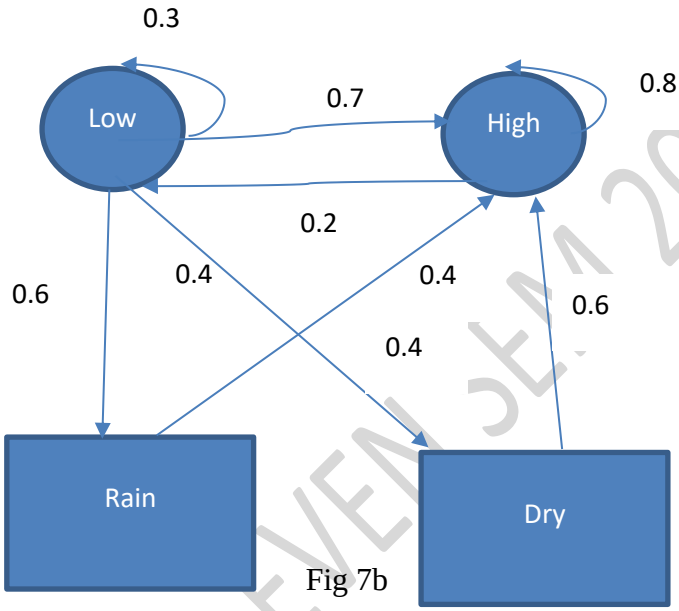
Programme: B.E. **Semester: VI**
Branch: ES – Cluster Elective **Duration: 3 hrs.**
Course Code: 19ET6CE1AI **Max Marks: 100**
Course: Artificial Intelligence **Date: 19.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Define in your own words: a) Intelligence b) Artificial Intelligence c) Agent d) Rationality e) Logical Reasoning.	*CO1*		**05**
	b)	Write pseudocode agent programs for the goal-based and utility-based agents.	*CO2*	*PO1*	**09**
	c)	Give PEAS description of the task environment and characterize in terms of properties for Playing Tic Tac Toe	*CO2*	*PO1*	**06**
		UNIT - II			
2	a)	Prove the following with an example. i. Breadth first search is a special case of uniform cost search. ii. Depth first search is a special case of Best first tree search iii. Uniform cost search is a special case of A* search.	*CO3*	*PO2*	**12**
	b)	Implement Alpha Beta Pruning for the following:  Fig 2b	*CO2*	*PO1*	**08**
		OR			

<table>
<tr><td></td><td>3</td><td>a)</td><td>Differentiate between Uninformed and Informed Search strategies with example.</td><td>CO3</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td>b)</td><td>Write pseudocode for Simulated Annealing technique.</td><td>CO2</td><td>PO1</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>UNIT - III</td><td></td><td></td><td></td></tr>
<tr><td></td><td>4</td><td>a)</td><td>Formulate Map coloring problem for an example.</td><td>CO2</td><td>PO1</td><td>08</td></tr>
<tr><td></td><td></td><td>b)</td><td>Solve the cryptarithmetic problem using the strategy of backtracking with forward checking and the MRV and least-constraining value heuristics.
TWO +
TWO
= FOUR.</td><td>CO2</td><td>PO1</td><td>08</td></tr>
<tr><td></td><td></td><td>c)</td><td>What is Arc consistency?</td><td>CO1</td><td></td><td>04</td></tr>
<tr><td></td><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td></td><td>5</td><td>a)</td><td>Write the algorithm for playing Wumpus game. Write PEAS description/propositional logic.</td><td>CO3</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td>b)</td><td>P: “ Humidity is high”
Q: “ Temperature is high”
C: “ One feels comfortable”
Represent using propositional logic:
“If the humidity is high and the temperature is high, then one does not feel comfortable”.</td><td>CO2</td><td>PO1</td><td>04</td></tr>
<tr><td></td><td></td><td>c)</td><td>Tabulate the Propositional logic Algorithms.</td><td>CO1</td><td></td><td>06</td></tr>
<tr><td></td><td></td><td></td><td>UNIT - IV</td><td></td><td></td><td></td></tr>
<tr><td></td><td>6</td><td>a)</td><td>Confusion matrix from Binary Classification Algorithm for predicting Male/Female from height. Demonstrate Bayes’ theorem for this case.
<table>
<tr><td>N=315</td><td>Actual F</td><td>Actual M</td><td>Sum</td></tr>
<tr><td>Predicted F</td><td>39</td><td>22</td><td>61</td></tr>
<tr><td>Predicted M</td><td>32</td><td>222</td><td>254</td></tr>
<tr><td>Sum</td><td>71</td><td>244</td><td>315</td></tr>
</table></td><td>CO2</td><td>PO1</td><td>10</td></tr>
<tr><td></td><td></td><td>b)</td><td>Classify Person whether he/she will play golf on the given outlook like Sunny, Rainy or Overcast.
Dataset:
<table>
<tr><td></td><td>Outlook</td><td>Play Golf</td></tr>
<tr><td>0</td><td>Rainy</td><td>NO</td></tr>
<tr><td>1</td><td>Rainy</td><td>NO</td></tr>
<tr><td>2</td><td>Overcast</td><td>YES</td></tr>
<tr><td>3</td><td>Sunny</td><td>YES</td></tr>
<tr><td>4</td><td>Sunny</td><td>YES</td></tr>
<tr><td>5</td><td>Sunny</td><td>NO</td></tr>
<tr><td>6</td><td>Overcast</td><td>YES</td></tr>
<tr><td>7</td><td>Rainy</td><td>NO</td></tr>
<tr><td>8</td><td>Rainy</td><td>YES</td></tr>
<tr><td>9</td><td>Sunny</td><td>YES</td></tr>
</table></td><td>CO3</td><td>PO2</td><td>10</td></tr>
</table>

			10 Rainy YES 11 Overcast YES 12 Overcast YES 13 Sunny NO			
			UNIT -V			
	7	a)	What are the three basic HMM problems?	*CO1*		**06**
		b)	Given the following HMM model. Calculate a probability of a sequence of observations in this example.  Fig 7b	*CO3*	*PO2*	**08**
		c)	Explore some applications of Re-inforcement learning.	*CO1*		**06**

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