

JK LAKSHMIPAT UNIVERSITY, JAIPUR
INSTITUTE OF ENGINEERING AND TECHNOLOGY
 End Term Examination (Regular/BackLog as Applicable), November-December 2018
 B. Tech in Computer Science Engineering, Semester VII

Roll No.....

CSE703 : ARTIFICIAL INTELLIGENCE

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A	Objective type multiple choice questions (10 questions @ 1 mark)	10
i.	Which are necessary for an agent to solve an online search problem? a) Step-cost function; b) Actions; c) Goal-test; d) All of the mentioned ;	
ii.	When do we call the states are safely explorable? a) A goal state is unreachable from any state b) A goal state is denied access c) A goal state is reachable from every state d) None of the mentioned	
iii.	In DFS, Time complexity is $O(b^d)$ and Space Complexity is $O(bd)$. What is b and what is d?	
iv.	An AI technique that allows computers to understand associations and relationships between objects and events is called : a) heuristic processing ; b) cognitive science ; c) relative symbolism; d) pattern matching	
v.	What is the term used for describing the judgmental or commonsense part of problem solving? a) Heuristic b) Critical c) Value based d) Analytical	
vi	Which of the following is a component of an expert system? a) inference engine; b) knowledge base ; c) user interface ; d) All of the above	
vii	Accuracy in machine learning is a) The percentage of predictions that are correct; b) The percentage of positive predictions that are correct; c) The percentage of positive cases that were predicted as positive; d) The percentage of negative cases that were predicted as negative;	
viii	To which depth does the alpha-beta pruning can be applied? a) 10 states ; b) 8 States ; c) 6 States ; d) Any depth	

- ix Which value is assigned to alpha and beta in the alpha-beta pruning?
 a) Alpha = max ; b) Beta = min ; c) Beta = max ; d) Both Alpha = max & Beta = min

- x Which is true regarding BFS?
 (a) BFS will get trapped exploring a single path
 (b) The entire tree so far been generated must be stored in BFS
 (c) BFS is not guaranteed to find a solution, if exists
 (d) BFS is nothing but Binary First Search
 (e) BFS is one type of sorting.

Q.2 Short answer type questions (4 questions @ 2.5 marks) 10

- Where pruning in Tree search is important?
- Differentiate between Supervised and Unsupervised learning.
- List two Informed Search and Two Uninformed Search Algorithms.
- Give example(s) of two systems that involves Fuzziness.

Q.3A Mention any one application of Clustering and showcase how distance algorithm would be applied to cluster the data. 05

Q.3 B Tic-tac-toe is zero sum game. Comment on the statement. Draw First two piles of Game tree for Tic-Tac-Toe. 05

Q.4A Express the following statements in Predicate Logic Format. 05

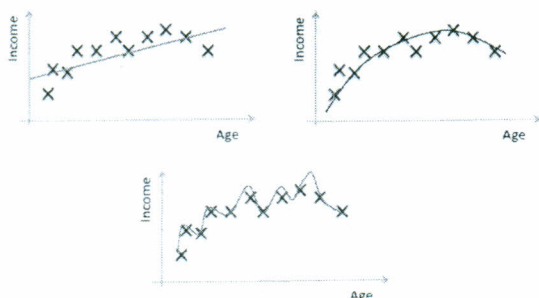
- Wonder is a name of a dog.
 - All dogs belong to the class of animals.
 - All animals either live on land or in water.
- Write down five issues that arise when representing Knowledge.

Q.4B What do you understand by heuristics? Discuss Sample heuristics that can be applied on solving 8 puzzle problem. Compare it. 05

Q.5A Explain detailed steps of Natural Language Processing for understanding following statements: 05

Dr. Sonal Jain is teaching Artificial Intelligence to Sem VII Students. They are very receptive and willing to learn new things with full enthusiasm and zeal. 05

Q.5B Categorize the below mentioned graphs base on Fit. (Underfit, Overfit, Just Right). What are the disadvantages of each of them?



Q.6A Following Table shows a confusion matrix and a cost matrix for a two-class 05

problem.

	Predicted +	Predicted -
True +	100	40
True -	60	300

(a) Confusion Matrix

	Predicted +	Predicted -
True +	-1	100
True -	20	0

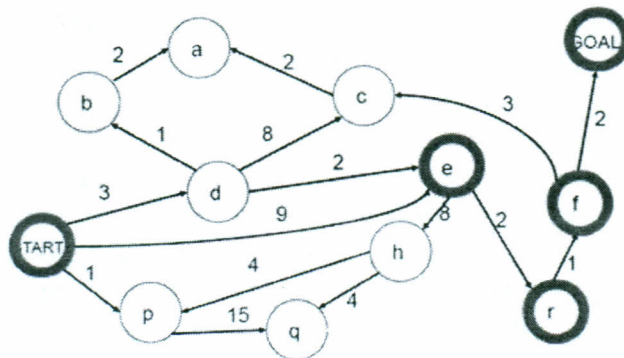
(b) Cost Matrix

Calculate the following measures: (a) Accuracy (b) Misclassification cost (c) Precision (d) Recall (e) F-measure.

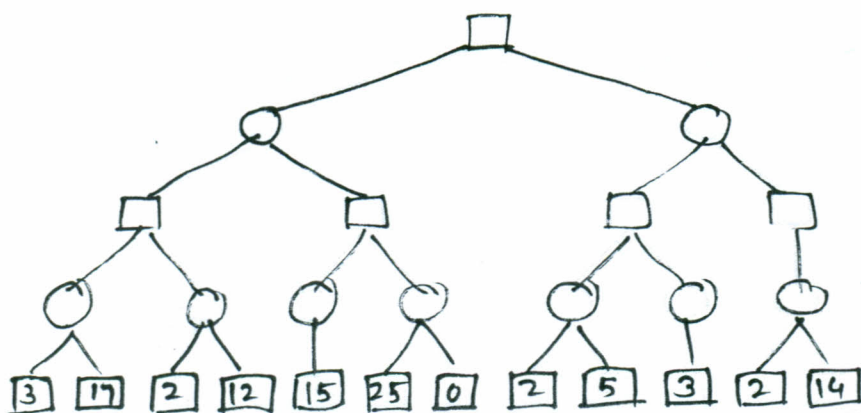
- Q.6B Consider a House cleaning Robot required to clean two rooms, with Power switch which can be one of the three states (on/off/sleep), Camera (on/off), Brush Height (1/2/3/4/5), Positions (10). Calculate number of nodes in a state space. 05

- Q.7A What are the different kinds of Logic used for Knowledge Representation? Explain each of them. 05

- Q.7B BFS finds the path with the fewest steps, but does not always find the cheapest path. Prove the statement using the graph shown below. 05



- Q.8A Consider the following graph. Apply Alpha-beta Pruning technique and showcase how this technique reduces time complexity of Game Tree. 10



- Q.9A Describe the utility of Machine Learning Technique. Explain step by step procedure to utilize K-Nearest neighbor technique to identify area of Interest of Students into four categories: Networking, Database Technologies, Management, Algorithms. 10

Q.9B	Describe the Utility of Manhattan Distance heuristics to solve 8-puzzle problem.	10
OR		
Q.9B	Consider the following pseudocode. <pre> function minimax(board, depth, isMaximizingPlayer): if current board state is a terminal state : return value of the board if isMaximizingPlayer : bestVal = @ for each move in board : value = minimax(board, depth-1, false) bestVal = max(bestVal, value) return bestVal else : bestVal = # for each move in board : value = minimax(board, depth-1, true) bestVal = min(bestVal, value) return bestVal </pre> Answer the Following Questions w.r.t above pseudo code: - What would be the initial Value of isMaximizingPlayer? - Mention the value of @ and # symbols mentioned in the code. - What is terminal state in above pseudocode? - Which Parameter of minimax() Funtion is allowing to call the instructions for min and max alternately? - Trace the Code for following instance and mention What could be the probable value of Depth? <pre> char board[3][3] = i. { ii. { 'x', 'o', 'x' }, iii. { 'o', 'o', 'x' }, iv. { ' ', ' ', ' ' } v. }; </pre> - Change the above pseudo code such that pruning of tree takes place.	20