Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2018

Subject Code: 2180703 Date: 04/05/2018

Subject Name: Artificial Intelligence

Time: 10:30 AM to 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	What is state space of a problem?	**03**
	(b)	Describe Breadth First Search. Comment on the optimalality of this method.	**04**
	(c)	In the Missionaries and Cannibals Problem, three missionaries and three cannibals must cross a river using a boat which can carry at most two people, under the constraint that, Number of cannibals should be lesser than the missionaries on either side. The boat cannot cross the river by itself with no people on board. For the above mentioned problem, describe state space representation, actions, start and end state.	**07**
Q.2	**(a)**	Describe heuristic function for the Travelling Salesman Problem.	**03**
	(b)	Discuss Turing Test.	**04**
	(c)	Discuss and Analyze Tower of Hanoi problem with respect to the seven problem characteristics.	**07**
		OR	
	(c)	Discuss Simulated Annealing search method. Compare it with hill climbing method.	**07**
Q.3	**(a)**	Discuss cut in prolog.	**03**
	(b)	Differentiate with example representation of "Instance" and "Isa" relationships.	**04**
	(c)	Explain with example how choosing the granularity of representation and finding the right structure are crucial issues in knowledge representation?	**07**
		OR	
Q.3	**(a)**	Discuss with example: Constraint Satisfaction Problem.	**03**
	(b)	Write a PROLOG program to find GCD of two numbers.	**04**
	(c)	Consider the following sentences: • Tennis is a game. Chess is a game. • John and Steve are students. • John plays Tennis. • Steve plays everything that John plays. • Students who play Tennis, do not play Chess. i. Translate the above sentences into formulas in Predicate logic ii. Prove using resolution that "Steve does not play Chess"	**07**
Q.4	**(a)**	Differentiate Fuzzy logic and Crisp logic.	**03**
	(b)	Explain Hopfield Network.	**04**
	(c)	Discuss Nonlinear Planning using Constraint Posting with example.	**07**

OR

Q.4 **(a)** Discus non-monotonic reasoning. **03**

(b) Discuss various defuzzification methods. **04**

(c) Explain following terms in reference to predicate logic Resolution. **07**

a. Unsuccessful attempt at resolution
b. Equality
c. Reduce
d. Trying several substitute

Q.5 **(a)** What is meant by Perceptron? Give one example. **03**

(b) Discuss Bayesian network and its application. **04**

(c) Write a PROLOG program Checking for Password. **07**

1. Give an opportunity to user to re-enter the password 'n' no. of times, on entering wrong password using Repeat predicate.
2. Give an opportunity to user to re-enter the password three (03) times, on entering wrong password.

OR

Q.5 **(a)** Consider the game tree given in Fig. 1, in which the evaluation function values are shown below each leaf node for the max player. Assume that the root node corresponds to the minimizing player. Assume that the search always visits children left-to-right. **03**

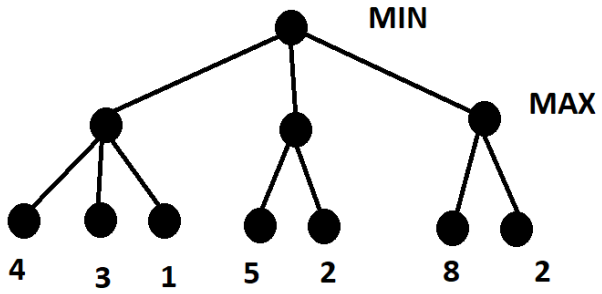

Fig : 1

Compute the backed-up values computed by the minimax algorithm by writing values at the appropriate nodes in the tree given.

(b) For the game tree given in Fig. 1, which nodes will not be examined by the alpha-beta pruning algorithm? Show the process of alpha-beta pruning to justify your answer. **04**

(c) Explain various steps of Natural Language Processing. **07**

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