Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II (Old course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 1720203 **Date:14/05/2015**

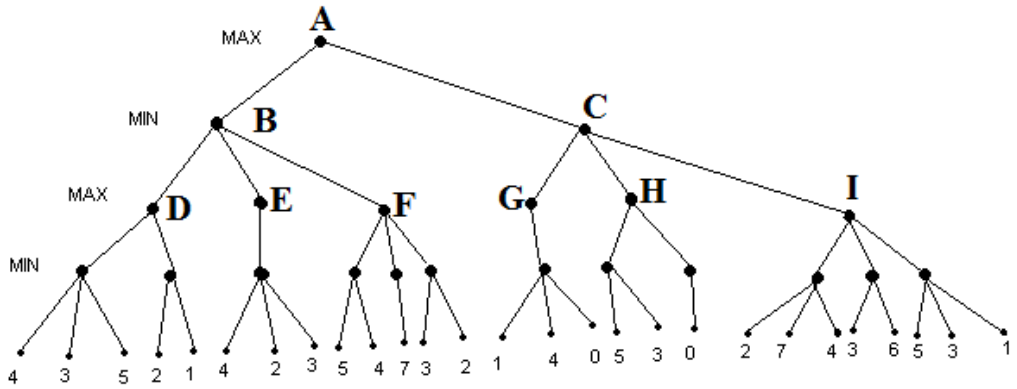
Subject Name: Artificial Intelligence

Time: 02:30 pm to 5:00 pm **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	Discuss various Encoding schemes to represent chromosome (with some example where it can be applied) and various Selection methods in Genetic Algorithm. Also state what should be probability of Crossover and Mutation? Why?	**07**
	(b)	Explain building blocks of Expert system. Discuss in detail, major problems faced by current Expert system.	**07**
Q.2	**(a)**	You are given 3 matrices A1, A2 and A3 with 3x4, 4x10 and 10x1 size respectively. Using AND-OR graph, show (out of multiple possibilities) the best way to multiply these matrices. i.e. A=A1*A2*A3. Assume proper cost function and justify your answer.	**07**
	(b)	What is Learning? Discuss Rote learning.	**07**
		OR	
	(b)	What is constraint satisfaction? How to solve constraint satisfaction problem? Show it using a suitable example.	**07**
Q.3	**(a)**	Analyze Chess, Travelling Salesman Problem (TSP) and Tower of Hanoi problems with respect to the following problem characteristics. i. Is the problem decomposable? ii. Can solution step be ignored? iii. Is the solution state or a path? iv. Is the universe predictable?	**07**
	(b)	What is iterative deepening search? How is it better than other uninformed search methods? Comment on completeness, optimality, time complexity and space complexity of it.	**07**
		OR	
Q.3	**(a)**	Represent the following sentences in first-order logic, using a consistent vocabulary : i. Some students took French in spring 2001. ii. Every student who takes French passes it. iii. Only one student took Greek in spring 2001. iv. The best score in Greek is always higher than the best score in French. Take the basic vocabulary be as follows: Takes(x,c,s) : student x takes course c in semester s Passes(x,c,s) : student x passes course c in semester s Score(x,c,s) : the score obtained by student x in course c in semester s Greater(x,y) : x is greater than y	**07**
	(b)	Why composition methods are required in fuzzy relation? Discuss max-product composition and max-min composition with example.	**07**

Q.4	**(a)**	Consider the following sentences: Å If the unicorn is mythical, then it is immortal, but if it is not mythical, then it is a mortal mammal. Å If the unicorn is either immortal or a mammal, then it is horned. Å The unicorn is magical if it is horned Using Propositional logic, find that: Is the unicorn mythical? Magical? Horned?	**07**
	(b)	Explain Forward and backward reasoning.	**07**
		OR	
Q.4	**(a)**	Assume the following facts: • Steve only likes easy courses. • Science courses are hard. • All the courses in the basket weaving department are easy. • BK301 is a basket weaving course. Use resolution to answer the question, ñWhat course would Steve like?ò	**07**
	(b)	Explain Unification, Soundness and completeness of rules with suitable example.	**07**
Q.5	**(a)**	Discuss following with respect to neural network: • Types of activation function • Supervised learning	**07**
	(b)	Discuss Bayesian network and its usage in probabilistic reasoning. Give suitable example to explain.	**07**
		OR	
Q.5	**(a)**	Explain all methods of defuzzification in detail.	**07**
	(b)	Perform the MiniMax algorithm on the following tree (tree is shown from the first playerôs point of view), first without and later with Ŭ ƀ -pruning. Comment on your answer.  Also answer following: • Which route would be selected? • How many nodes are saved from getting explored if Ŭ ƀ ï pruning is used? Show those nodes.	**07**

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