Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 710207N **Date: 16-01-2013**

Subject Name: Parallel Computing

Time: 02.30 pm – 05.00 pm **Total Marks: 70**

Instructions:

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

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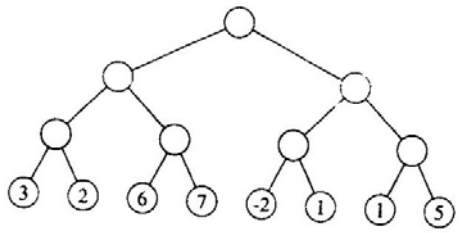
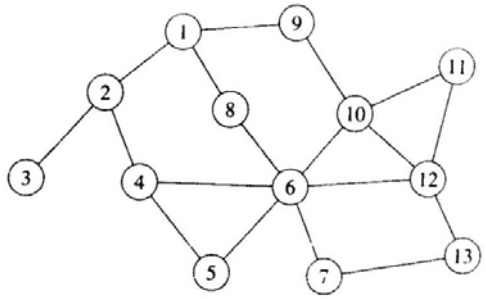
Q.1	**(a)**	Parallelize Kruskal's sequential minimum spanning tree algorithm. Discuss the time complexity of the parallel algorithm.	**07**
	(b)	Explain temporal, data and control parallelism with examples.	**07**
Q.2	**(a)**	Explain CREW PRAM algorithm to preorder tree traversal.	**07**
	(b)	What does it mean that parallel machine architecture is UMA, NUMA, and CC-NUMA architecture? From an architecture evolution point of view, why was each type of architecture developed?	**07**
		OR	
	(b)	What are the different criteria to evaluate processor organization? Obtain Perfect Shuffle Permutation network of 32 nodes.	**07**
Q.3	**(a)**	Explain why PRAM algorithm must be cost optimal in order for it to be a realistic candidate for implementation on a real parallel computer.	**07**
	(b)	Write a UMA multiprocessor summation algorithm that uses fan-in strategy to compute global sum from subtotals	**07**
		OR.	
Q.3	**(a)**	Determine the processor efficiency of hypercube SIMD matrix multiplication algorithm as a function of the matrix dimension n.	**07**
	(b)	Write a Coffman –Graham scheduling algorithm.	**07**
Q.4	**(a)**	What are the factors to measure quality of parallel algorithm implementation?	**07**
	(b)	What are the two phases of odd-even transposition sort algorithm? Sort the following sequence GHFDECBA	**07**
		OR	
Q.4	**(a)**	What is bitonic sequence? Using Bathcer's bitonic merge sort algotihm, sort the following sequence 7,9,10,2,3,6,16,1,14,5,15,8,4,11,13,12	**07**
Q.4	**(b)**	Explain multiprocessor oriented parallel quick-sort algorithm.	**07**
Q.5	**(a)**	Use alpha-beta algorithm to evaluate the following game tree	**07**



(b) Write a parallel version of Moore's single source shortest path algorithm. **07**

OR

Q.5 **(a)** Evaluate P-depth search, parallel breadth depth search and parallel breadth first search on following graph. (Assume that p=3, the search begins at vertex 1, and adjacent vertices are always explored in increasing order of the vertex numbers.) **07**



(b) What are the anomalies in the parallel branch and bound algorithm? **07**

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