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GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–VIII (OLD) EXAMINATION – WINTER 2020

Subject Code:180702   **Date:19/01/2021**
Subject Name:Parallel Processing
Time:02:00 PM TO 04:00 PM   **Total Marks: 56**

Instructions:
1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1	**(a)**	Explain pipelining and superscalar execution with suitable examples.	**07**
	(b)	Briefly explain NUMA and UMA computers. Briefly explain state diagram of simple three state coherence protocols. Also explain Snoopy and Directory based cache coherence mechanism	**07**
Q.2	**(a)**	Discuss different performance metrics of parallel systems.	**07**
	(b)	Briefly explain following Decomposition techniques. 1) Data Decomposition 2) Speculative Decomposition 3) Exploratory decomposition	**07**
Q.3	**(a)**	With block diagram explain the possible implementation of **Send** and **Receive** primitives in message passing interface. Mention the advantages and disadvantages of each implementation.	**07**
	(b)	Enlist and discuss different parallel algorithm models in detail.	**07**
Q.4	**(a)**	Explain Mutual Exclusion and Condition Variable with proper example.	**07**
	(b)	Explain Scatter and Gather communication operation.	**07**
Q.5	**(a)**	Explain invalidate protocol used for cache coherence in multiprocessor system.	**07**
	(b)	What is the role of Comparator in Sorting? Explain Odd-Even Transposition sort algorithm with example.	**07**
Q.6	**(a)**	Explain bitonic sort with example.	**07**
	(b)	Briefly explain Cannon's matrix-matrix multiplication algorithm. Find parallel execution time of this algorithm. What is the cost-optimal condition for this algorithm?	**07**
Q.7	**(a)**	With respect to Dense Matrix Algorithms, draw and explain Matrix-Vector Multiplication with Rowwise 1-D partitioning.	**07**
	(b)	Briefly explain pthread_create, pthread_join and pthread_exit functions related to thread. Explain attributes associated with threads and mutex. Briefly explain different types of mutex	**07**
Q.8	**(a)**	Write an algorithm for Single-Source Shortest Paths.	**07**
	(b)	Briefly explain parallel algorithm of Quick sort with example for shared address space parallel computer.	**07**

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