GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII • EXAMINATION – SUMMER • 2015

Subject Code: 180702   **Date:11/05/2015**

Subject Name: Parallel Processing

Time:10.30AM-01.00PM   **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)**	Define Latency and Bandwidth of memory. Briefly explain different ways to minimized latency and to increase bandwidth of memory?	**07**
	(b)	Briefly explain different classification of parallel computers	**07**
Q.2	**(a)**	Briefly explain static and dynamic interconnection networks for parallel computers	**07**
	(b)	Define following terms and explain the importance related to parallel algorithm design 1. Decomposition 2. Concurrency 3. Granularity	**07**

OR

	(b)	Briefly explain usefulness of task dependency and task interaction graph related to parallel algorithm design. Draw task interaction graph for sparse matrix vector multiplication.	**07**
Q.3	**(a)**	Briefly explain following decomposition techniques used in parallel algorithm design 1. Data decomposition 2. Exploratory decomposition 3. Speculative decomposition	**07**
	(b)	Briefly explain one to all broadcast and all to one reduction on eight node hypercube. Also find the cost of communication for one to all broadcast on eight node hypercube	**07**

OR

Q.3	**(a)**	Briefly explain all to all personalized communication and its applications. Briefly explain an optimal algorithm of all to all personalized communication on eight node hypercube	**07**
	(b)	Briefly explain loop splitting, self scheduling and chunk scheduling for task mapping to achieve load balancing among processes	**07**
Q.4	**(a)**	Enlist various performance metrics for parallel systems. Explain Speedup, Efficiency and Cost in brief.	**07**
	(b)	Define Isoefficiency function and derive equation of it.	**07**

OR

Q.4	**(a)**	Briefly explain the relation between Speedup and efficiency as functions of the number of processing elements. Derive the equation which relate speedup and efficiency with processing elements	**07**
	(b)	Briefly explain **Four** different implementation of Send and Receive operations. Briefly explain Send and receive functions of MPI .	**07**

Q.5 **(a)** Explain following MPI routines with arguments.   **07**
MPI_Gather
MPI_Scatter
MPI_Reduce

(b) Briefly explain Cannon's algorithm for Matrix-Matrix multiplication. What are **07** the advantages of this algorithm over other parallel algorithm of matrix multiplication?

OR

Q.5 **(a)** Briefly explain different synchronization primitives available in Pthread. Explain **07** three types of mutex (normal, recursive and error check) in context to Pthread.

(b) Briefly explain parallel algorithm of Quick sort with example for shared address **07** space parallel computer.

****