

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 **07**

1. Decomposition
2. Concurrency
3. Granularity

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 **07**

1. Data decomposition
2. Exploratory decomposition
3. Speculative decomposition

(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 the advantages of this algorithm over other parallel algorithm of matrix multiplication? **07**

OR

- Q.5 (a)** Briefly explain different synchronization primitives available in Pthread. Explain three types of mutex (normal, recursive and error check) in context to Pthread. **07**
- (b)** Briefly explain parallel algorithm of Quick sort with example for shared address space parallel computer. **07**
