

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VIII • EXAMINATION – SUMMER 2013

Subject Code: 180702**Date: 13/05/2013****Subject Name: Parallel Processing****Time: 10:30 am TO 01:00 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) Draw and explain architecture of Uniform Memory Access (UMA) and Non-Uniform Memory Access (NUMA) shared-address-space computer with applicable caches and memories. **07**
- (b) Enlist various decomposition techniques. Explain data decomposition with suitable example. **07**
- Q.2** (a) Enlist various performance metrics for parallel systems. Explain Speedup, Efficiency and total parallel overhead in brief. **07**
- (b) Explain scatter and gather operations in detail. **07**
- OR
- (b) Draw and explain All-to-All personalized communication on a ring. **07**
- Q.3** (a) Define Isoefficiency function and derive equation of it. **07**
- (b) Explain following MPI routines with arguments. **07**
- I. MPI_Send
- II. MPI_Recv
- III. MPI_Sendrecv
- OR
- Q.3** (a) Explain dynamic mapping schemes for load balancing in details. **07**
- (b) Explain following MPI routines with arguments. **07**
- I. MPI_Scan
- II. MPI_Reduce
- Q.4** (a) Explain three types of mutex (normal, recursive and error check) in context to Pthread. **07**
- (b) With respect to Dense Matrix Algorithms, draw and explain Matrix-Vector Multiplication with Rowwise 1-D partitioning. **07**
- OR
- Q.4** (a) Draw the logical machine model of a thread-based programming paradigm. Also describe the benefits of using Thread in programming. **07**
- (b) Explain DNS algorithm for Matrix-Matrix multiplication. **07**
- Q.5** (a) Discuss Odd-Even Transposition sort. **07**
- (b) Discuss Prim's Algorithm for Minimum Spanning Tree. **07**
- OR
- Q.5** (a) Discuss mapping of bitonic sort algorithm to a hypercube and a mesh. **07**
- (b) Explain Dijkstra's Algorithm for Single-Source Shortest Paths. **07**
