

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (OLD) EXAMINATION – SUMMER 2019****Subject Code: 180702****Date: 09/05/2019****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) Enlist and discuss different parallel algorithm models in detail. **07**
(b) Explain pipelining and superscalar execution with suitable example. **07**
- Q.2** (a) Enlist various decomposition techniques. Explain data decomposition with suitable example. **07**
(b) Explain All-to-All Broadcast and All-to-All Reduction on eight node hypercube. **07**
- OR**
- (b) Explain scatter and gather communication operation with example. **07**
- Q.3** (a) Explain Cannon's algorithm for matrix multiplication. **07**
(b) Enlist various performance metrics for parallel systems. Explain Speedup, Efficiency and total parallel overhead in brief. **07**
- OR**
- Q.3** (a) With respect to Dense Matrix Algorithms, draw and explain Matrix-Vector Multiplication with Row wise 1-D partitioning **07**
(b) Discuss buffered non-blocking and non-buffered non-blocking send/receive message passing operations with neat sketches. **07**
- Q.4** (a) Briefly explain different synchronization primitives available in Pthread. Explain the following mutex (normal, recursive and error check) in context to Pthread **07**
(b) Write the functionality of the following MPI primitives or routines: **07**
i. MPI_Init
ii. MPI_Scan
iii. MPI_Reduce
- OR**
- Q.4** (a) Explain following functions and its arguments with respect to Pthreads API. **07**
i. pthread_create()
ii. pthread_join()
(b) Explain following MPI routines with arguments. **07**
i. MPI_Sendrecv
ii. MPI_Send
iii. MPI_Recv
- Q.5** (a) Explain Dijkstra's Algorithm for Single-Source Shortest Paths. **07**
(b) Explain Bitonic sort with example. **07**
- OR**
- Q.5** (a) Discuss Prim's Algorithm for Minimum Spanning Tree. **07**
(b) Briefly explain parallel version of Quick sort algorithm for shared address space system. **07**
