Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER–III • EXAMINATION – SUMMER • 2014

Subject Code: 650005   **Date: 30-05-2014**
Subject Name: Parallel Programming
Time: 10:30 am - 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 Answer the following questions   **14**
  (a) Explain UMA model in brief
  (b) What is advantage of distributed memory model?
  (c) Give example of control dependency.
  (d) Differentiate: parallel computing vs. distributed computing
  (e) Define: latency and throughput
  (f) Given a task that can be divided into m subtasks, each requiring one unit of time, how much time is required for an m-staged pipeline to process n tasks?
  (g) What is cache coherence issue in multiprocessors?

Q.2 **(a)** Explain desirable characteristics of a machine having multiple processors   **07**
  (b) Explain clusters in detail also explain features of HP Cluster Platform 6000 blade.   **07**
                                      OR
  (b) Explain crossbar switch interconnection with its advantage and disadvantage.   **07**

Q.3 **(a)** What is dependency? Check whether following statements can be executed in parallel and find   **07**
         out dependencies if any
         1) S1: A = B + C   S2: D = 2*A
         2) S1: A = B + C   S2: B=0
         3) S1: A = B + C   S2: A = A -D
  (b) What are the basic constraint behind shared memory programming? Explain General   **07**
         model of shared memory programming.
                                      OR
Q.3 **(a)** Write detailed note on Loop dependence analysis and Array dependence analysis.   **07**
  (b) Explain backward dependency and forward dependency with suitable example.   **07**

Q.4 **(a)** Explain following primitive in process model under Unix   **07**
         1) Process creation 2) Merge processes   3) Shared memory allocation
  (b) Explain POSIX threads routines for acquiring and releasing mutex.   **07**
                                      OR
Q.4 **(a)** Explain synchronization primitives in Unix process model.   **07**
  (b) What is condition variable? How can we wait on conditional variable and signal a   **07**
         conditional variable.

Q.5 **(a)** What is message passing model? Explain following MPI routines   **07**
         1) MPI_Finalize()   (2) MPI_Send()   (3) MPI_Recv()
  (b) Write parallel algorithm for histogram computation.   **07**
                                      OR
Q.5 **(a)** Write short note on point to point and collective communication in message passing   **07**
         interface.
  (b) Write Matrix multiplication algorithm for tightly coupled multiprocessors.   **07**
                            ****