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 out dependencies if any **07**

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 model of shared memory programming. **07**

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 conditional variable. **07**

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 interface. **07**

(b) Write Matrix multiplication algorithm for tightly coupled multiprocessors. **07**

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