

**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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