

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER-III • EXAMINATION – SUMMER 2013

Subject Code: 650005

Date: 17-05-2013

Subject Name: Parallel Programming

Time: 02.30 am - 05.00 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) Write down the answer of following questions:

- | | |
|--|-----------|
| 1) Mention some areas where parallel processing is needed? | 02 |
| 2) Explain Amdahl's law | 02 |
| 3) Give the full form of GPUs. | 01 |
| 4) Explain the term Concurrency and Parallelism | 02 |

(b) Match the following: **07**

- | | |
|------------------------------------|---|
| 1. Atomicity is associated with | 1. condition variable |
| 2. Synchronization is supported by | 2. Only one functional configuration at a time. |
| 3. MPI is | 3. several function configuration to exist simultaneously |
| 4. Latency refers to | 4. the amount of work that can be completed per unit time. |
| 5. Throughput refers to | 5. serialization |
| 6. Static pipeline may assume | 6. the amount of time it takes to complete a given unit of work |
| 7. Dynamic pipeline may assume | 7. a library |

Q.2 (a) (1) Define Parallel Processing. **02**

(2) Explain Flynn's Classification. **03**

(3) Define Atomicity. **02**

(b) Explain different phases of Generic Compilation Process with diagram. **07**

OR

(b) List down different Parallel Computers and Explain any one. **07**

Q.3 (a) Differentiate between forward and backward dependency with example. **07**

(b) Differentiate following terms: **07**

- (1) Parallelism versus Performance
- (2) Threads versus Processes
- (3) Output versus Input dependency

OR

Q.3 (a) (1) What is the need of shared memory in parallel programming explain with example. **07**

- (2) Explain NUMA architecture model.
- (b)** Explain need of mutual exclusion for multiprocessing application. Explain with code. **07**
- Q.4 (a)** Explain pthread_create() function with its parameter and explain multithread creation and destruction in multithreaded program. **07**
- (b)** (a) What are the sources of performance loss? Explain any one in detail. **04**
 (b) For which purpose is the concept of granularity used? **03**
- OR**
- Q.4 (a)** What is the need of barrier in multiprocessing program? Show the usage of barrier in multiprocessing program (written in C under UNIX). **07**
- Q.4 (b)** Explain the term “Induction Variable” and “Loop Splitting” **07**
- Q.5 (a)** (1) Explain the architecture of PVM. **03**
 (2) Short note on MPI. **04**
- (b)** Explain the functionalities of following functions with their parameters. **07**
 semget(), semop()
- OR**
- Q.5 (a)** (1) Explain scalability and performance portability in parallel programming. **04**
 (2) Define following terms in context of measuring performance for multiprocessing system. **03**
 Execution time, speed up, efficiency.
- (b)** (a) Explain the functionality of following functions with their parameters: **04**
 MPI_Init(), MPI_Comm_Rank()
 (b) Which loop do we parallelize in matrix multiplication? **03**
