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 ith 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 prog ming explain with example. **07**

(2) Explain NUMA architecture model.

(b) Explain need of mutual exclusion for multiprocessing a plication. Explain with code. **07**

Q.4 (a) Explain pthread_create() function with its parameter a d 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 us d? **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 multiplicat n? **03**

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