Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA- Vth SEMESTER–EXAMINATION –JUNE - 2012

Subject code: 650005   **Date: 14/06/2012**
Subject Name: Parallel Programming (PP)
Time: 02:30 pm – 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 true/false.   **03**
    (i) In newly created child process, fork() returns -1.
    (ii) Efficiency with super-linear speedup is greater than one.
    (iii)Work load is balanced when block-scheduling is used.

    (b) List any four characteristics of good parallel program. Explain any one **04**
    in detail.

Q.2 **(a)** (i) Write a function to create nproc processes identified as 1 to nproc. **03**
    (ii) Discuss about shared memory UMA model. **04**

    (b) (i) What do you mean by L1 and L2 cache? Write main difference **03**
    between Dual Core and Core Duo with respect to position of L2
    cache.
    (ii) Write parallel code segment to find sum of elements of an array using **04**
    self-scheduling mechanism. Do not write functions to create/destroy
    processes, allocate/use shared memory or semaphores.
<div align="center">OR</div>
    (b) (i) Explain shmget() in brief. **03**
    (iii) Explain an allocation of n independent jobs to nproc processes using **04**
    loop-splitting and block scheduling technique. Which technique is
    better? Why?

Q.3 **(a)** Define DEF and USE sets with respect to data dependency. List various **07**
    types of scalar data dependency. Explain any two giving examples with
    the use of DEF and USE.
    (b) Write a parallel program segment to compute histogram of vowels used in **07**
    a string using threads.
<div align="center">OR</div>
Q.3 **(a)** Define forward dependency. Give example. Discuss the ways to get rid of **07**
    the problem due to this dependency.
    (b) Discuss about parallel prefix sum of array elements with example. **07**

Q.4 **(a)** Define backward dependency. Give two examples. Transform given **07**
    examples to remove the problem due to this dependency.
    (b) Discuss POSIX functions related to mutex variable. **07**
<div align="center">OR</div>
Q.4 **(a)** Define contention. Discuss about its problem and solution related to **07**
    parallel programming.
    (b) Explain function pthread_create() with its parameters in detail. Give **07**
    example.

Q.5 **(a)** Write a short note on granularity. **07**

(b) Write full form of MPI. Explain the use of functions MPI_Init(), **07** MPI_Comm_size() and MPI_Comm_rank().

OR

Q.5 **(a)** Write full form of CTA, a parallel computer model. Draw its architecture **07** and write its properties.

(b) What do you mean by PVM? Draw block diagram to explain PVM **07** architecture. Discuss the role of pvmd.

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