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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – DEC 2013 / JAN 2014

Course & Branch	: **B.E.- INFORMATION SCIENCE & ENGG.**	**Semester**	: **VII**
Subject	: **Parallel Programming**	**Max. Marks**	: **100**
Subject Code	: **IS702**	**Duration**	: **3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT – I

1. a) Write a parallel version of Count3s program? Discuss whether you have really achieved improved performance using this program and if not, how to achieve performance. (10)
   b) Explain chip multiprocessor technology using any two types of processors. (10)

2 a) Write one possible recipe for building a cluster. Explain the benefits of RAM model in sequential computing. (10)
   b) Explain three types of memory reference mechanisms used for parallel communication among processors. (10)

UNIT – II

3. a) Explain the different sources of parallel performance loss. (10)
   b) Explain the following performance trade-offs: communication Vs computation and memory Vs parallelism. (10)

4. a) Define Speedup and Efficiency of parallel computation. How can you inadvertently increase speedup? Explain any two ways in detail. (10)
   b) Write fixed parallelism and scalable parallelism versions of programs for Count3s computation. (10)

UNIT – III

5. a) Describe three examples each for generalized reduces and scans. (10)
   b) Explain block allocations and overlap regions methods of allocating work to processes. (10)

6. a) Write the four generalized reduce functions for implementing secondMin reduce. (10)
   b) What is a work queue? How is it used to assign work to processes? (10)

UNIT – IV

7. a) List and explain the routines related to mutual exclusion and synchronization in POSIX. (10)
   b) List and explain safety related issues when using multiple threads in POSIX. (10)

8. a) Explain with an example each for any two parallel directives, any three runtime library routines and any two environment variables available in OpenMP. (10)

b) Write a program to add two arrays and store the result in variable using reduction clause in OpenMP. How is reduction better than critical section? (10)

UNIT – V

9. a) Write MPI solution to Count3s problem with comments to all MPI functions used. (10)
   b) Explain routines available for collective communication in MPI. (10)

10. a) Explain four important properties of Parallel Languages used to evaluate different programming approaches. (10)
    b) Write short notes on (i) Graphics Processing Units and (ii) Cell Processors. (10)

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