

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2710

Roll No. 0916110042

### B.Tech.

(SEM. VII) ODD SEMESTER THEORY  
EXAMINATION 2012-13

### PARALLEL ALGORITHMS

Time : 3 Hours

Total Marks : 100

Note :- (i) Attempt all questions.

(ii) All questions carry equal marks.

1. Attempt any **two** of the following : (10×2=20)
  - (a) Explain RAM model of serial computation and PRAM model of parallel computation. Summarize the similarities and differences between them.
  - (b) Describe pyramid network processor organization for parallel computers. Find and describe the expression to determine the total numbers of processors in a pyramid network of size  $k^2$ .
  - (c) Describe butterfly network in brief. Devise a PRAM algorithm to multiply two  $n \times n$  matrices, where  $n = 2^k$ .
  
2. Attempt any **two** of the following : (10×2=20)
  - (a) Write and describe the basic metrics and measures for analyzing the performance of parallel algorithms.

- (b) Describe the cost optimal scheme to compute the partial sums of the following :

$$S_k = \sum_{i=1}^k x_i \quad 1 \leq k \leq n$$

- (c) Write short notes on data parallel approach and control parallel approach.

3. Attempt any two of the following : (10×2=20)

- (a) What do you understand by parallel sorting? Do you think it is accurate to describe odd even transposition sort as a parallel bubble sort. Justify your answer.
- (b) Describe Bitonic sequence. Discuss the Bitonic merge on Shuffle-Exchange network.
- (c) Describe a quicksort algorithm suitable for implementation on hypercube multicomputers.

4. Attempt any two of the following : (10×2=20)

- (a) List the various parallel searching algorithms. Explain any one of them.
- (b) What is back substitution method for solving linear equation? Describe a parallel back substitution algorithm suitable for implementation on UMA multiprocessor.
- (c) Discuss 2-D mesh SIMD model. Describe matrix multiplication on 2-D mesh SIMD model.

5. Attempt any two of the following : (10×2=20)

- (a) Write the various types of parallel methods to find the connected components of an undirected graph. Explain any two of them.
- (b) What is combinatorial search problem? How a search problem can be represented by tree? Describe a combinatorial searching problem solving methodology that can be represented by tree.
- (c) Describe permutation, combination and derangements in brief.