

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

Paper ID : 110663

Roll No. 

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**B.TECH.**

Theory Examination (Semester-VI) 2015-16

**PARALLELALGORITHMS***Time : 3 Hours**Max. Marks : 100***Section-A**

**Q.1. Attempt all parts. All parts carry equal marks. Write  
answer of each part in short. (2×10=20)**

- (a) Define Cost and Speed-up in parallel algorithm.
- (b) What do you mean by parallel algorithm and parallel computer?
- (c) Write down the design strategies of parallel algorithm.
- (d) Explain CRCW and ERCW computational model in brief.

(1)

P.T.O.

- (e) Differentiate between static and dynamic interconnection network.
- (f) What is sequential alpha-beta search?
- (g) Differentiate between sequential matrix multiplication and parallel matrix multiplication.
- (h) Show the difficulties of solving linear equation on parallel machine in brief.
- (i) Write two approaches used for dimensionality reduction.
- (j) Compare sequential searching with parallel searching algorithm.

#### Section-B

**Q.2. Attempt any five questions from this section. (10×5=50)**

- (a) Explain sequential model and show the need of parallel model and explain any two following models
  - (i) Hypercube
  - (ii) Tree model
  - (iii) Butterfly

(2)



- (b) Define the following
- (i) Contrasting pipelining and data parallelism
  - (ii) Scalability
- (c) Discuss the vector-matrix multiplication with the help of example.
- (d) Explain even-odd transposition sort and shear sort algorithm with neat and clean diagrams.
- (e) Discuss the combinatorial algorithms with suitable example.
- (f) A  $p$ -processor PRIORITY PRAM can be simulated by a  $p$ -processor EREW PRAM with time complexity increased by a factor of  $\Theta(\log p)$ . Prove it.
- (g) Sort a list (C, D, B, H, E, G, F, A) using bitonic merge sort.
- (h) Describe a quick sort algorithm suitable for implementation on hypercube multi-computers.

### Section-C

Attempt any two questions from this section. (15×2=30)

- Q.3. What do you mean by cost optimal algorithm? Compute the speedup, cost and efficiency for addition of  $n$  numbers by using  $n/2$  processors by parallel reduction (parallel sum) algorithm compared to sequential algorithm.
- Q.4. Let  $A = \{5, 2, 4, 5\}$  be a sequence and  $p = 16$  where  $p$  is no processors. Sort this sequence by using Enumeration sort algorithm for CRCW technique and show each step. Also write the algorithm.
- Q.5. Write short notes on any two
- Parallel version algorithm for all-pair shortest paths
  - Gauss method for solving linear system
  - Parallel Kruskal's algorithm for MST.