

**B TECH**  
**(SEM VI) THEORY EXAMINATION 2018-19**  
**PARALLEL ALGORITHM**

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

1. Attempt all questions in brief. 2 x 10 = 20
- Explain matrix operations in parallel algorithm.
  - What is sequential bottleneck in Amdahl's law
  - What is parallel- backtracking ?
  - Write two approaches used for dimensionality reduction.
  - Show the difficulties of solving linear equation on parallel machine in brief.
  - What is sequential alpha-beta search ?
  - What is SIMD ?
  - Explain hyper cube connection.
  - What is the complexity of prefix sum in PRAM model ?
  - How long does the parallel version of Prim's minimum spanning tree finding algorithm require for a graph with n nodes using p processors

## SECTION B

2. Attempt any three of the following: 10x3=30
- What do you mean by parallel sorting networks? Also discuss the enumeration sort algorithm?
  - Explain Bitonic merge sort. Sort a list (C, D, B, H, E, G, F, A) using bitonic merge sort.
  - Describe the Butterfly Model with suitable diagram
  - Explain PRAM Computational model. Along with brief explanation of EREW and CREW computational model.
  - Explain even-odd transposition sort and shear sort algorithm with neat and clean diagrams.

## SECTION C

3. Attempt any one part of the following: 10 x 1 = 10
- Write and discuss Cost-optimal Parallel algorithm to find prefix sums and explain Brent's theorem ? Write its statement and proof.
  - Explain parallel merging. Also explain merging on EREW model.
4. Attempt any one part of the following: 10 x 1 = 10
- Describe a quicksort algorithm suitable for implementation on hypercube multi-computers.
  - Explain the following
    - Contrasting pipelining and data parallelism
    - scalability
5. Attempt any one part of the following: 10 x 1 = 10
- Discuss the vector-matrix multiplication with the help of example.
  - What is data parallelism? Explain difference between Data Parallelism Vs Task Parallelism and Data Parallelism and Model Parallelism.
6. Attempt any one part of the following: 10 x 1 = 10
- A p-processor PRIORITY PRAM can be simulated by a p-processor EREW PRAM with time complexity increases by a factor of  $\Theta(\log p)$ . Prove it
  - Explain parallel Branch and Bound search?
7. Attempt any one part of the following: 10 x 1 = 10
- What is combinational search problem ? Describe a combinatorial searching problem solving methodology that can be represented by tree. Also explain the breadth search and depth search algorithm with example.
  - Explain the following
    - Parallel version algorithm for all pair shortest paths.
    - Parallel Kruskal's algorithm for MST.