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B. Tech  
PECS 3407

## Eighth Semester Examination – 2007

### PARALLEL AND DISTRIBUTED SYSTEMS

Full Marks – 70

Time – 3 Hours

*Answer Question No. 1 which is compulsory  
and any **five** from the rest.*

*The figures in the right-hand margin indicate full  
marks of the questions.*

1. Answer the following questions : 2×10
- (a) Define and differentiate between static and dynamic interconnection network.
  - (b) How cost of the static interconnection network is computed ?

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- (c) What is Cut-Through Routing ? How the total communication time is calculated for a cut through routing ?
- (d) What is data parallel model for parallel algorithm ?
- (e) Define and differentiate between adaptive routing and deterministic routing.
- (f) What are the different characteristic of Inter-task Interaction ?
- (g) How static interconnection networks are differs from dynamic interconnection network ?
- (h) Define, 'latency' and 'bandwidth' of memory.
- (i) Why and when the isoefficiency function is used in analytical modelling of parallel program ?
- (j) What do you mean by speculative decomposition of parallel program ?
2. (a) What is the diameter, connectivity, maximum degree and bisection width of a 3-dimensional mesh of with  $n = m \times m \times m$  nodes ? 5

- (b) Discuss the process of embedding a **mesh** into a **hypercube**. 5
3. (a) Explain the different mechanism for dynamic mapping of tasks. 5
- (b) Compute the total amount of memory required by the parallel formulation of Dijkstra's algorithm to compute single-source shortest paths. 5
4. (a) What do you mean by granularity ? Discuss the effect of granularity on performance. 5
- (b) Explain the different mechanism to reduce the interaction among concurrent task in parallel computing system. 5
5. (a) What is scalability of parallel programs ? Explain how one can evaluate the scalability using analytical tools. 5
- (b) What are the various issues to be addressed on realization of parallel sorting algorithm ? 5
6. (a) Describe a parallel formulation of matrix-vector multiplication algorithm using 2-D block partitioning. 5



- (b) Explain the process to perform scatter and gather operation on a hypercube. 5
7. (a) What is message passing architecture ?  
Discuss the concept and application of MPI in parallel computing. 5
- (b) Discuss the method to parallelizing QUICKSORT algorithm on CRCE PRAM. 5
8. Write short notes of the following : 2.5x4
- (a) Static mapping of task
- (b) Recursive decomposition
- (c) Cut through routing
- (d) Routing in interconnection network.

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