53 (CS 714) PRCO

2018

PARALLEL COMPUTING

Paper : CS 714

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* With an example, discuss about the Amdahl's law.

   (b) With a diagram, discuss the PRAM model of Parallel Computation. 10+10

2. *(a)* Write a PRAM algorithm to reverse a string of length '*n*'.

   (b) Compute the complexity of your algorithm.

(c) Apply your algorithm on the following array :

X	A	B	C	D	E	F	Y

10+5+5

3. With suitable diagram, compute the diameter and bisection width of the following processor organizations : 4×5

(i) 2D Mesh network

(ii) Binary tree network

(iii) Butterfly network

(iv) Hypercutbe network.

4. (a) Prove that a dialation-1 embedding of a complete binary tree of height n into a hypercube of dimension $n+1$ does not exist if $n>1$.

(b) Prove that a binomial tree of height more that 4 cannot be embedded into a 2D mesh. 10+10

5. (a) Write a PRAM algorithm for the odd-even transposition sort. Compute the complexity of your algorithm.

(b) With an example, discuss about the shuffle-exchange network.

10+10

6. (a) What is bitonic sequence ?

(b) Use bitonic merge to sort the following array :

7	3	4	6	1	5	2	9

5+15