



- (c) Explain how theoretically parallel algorithms are analyzed.
- (d) What do you mean by cost optimality of an algorithm?
- (e) Write two approaches used for dimensionality reduction.
- (f) What are the different types of components of execution time?
- (g) Define the sequential model. Discuss the need of an alternative model.
- (h) What is data parallelism? Is it similar to pipelining?
- (i) Define cost optimal and non-cost optimal algorithm.
- (j) What do you mean by parallelizability and scalability of an algorithm?

### Section-B

**Note: Attempt any five questions from this section.**

10×5=50

Q2. What are the various performance measures of parallel

algorithm? Discuss with example.

- Q3. Cost optimality is seen to judge the goodness of parallel algorithm. With the example of summation illustrate this concept.
- Q4. Write down the parallel quick sort algorithm. Also analyze its time complexity.
- Q5. Define the selection problem. Show that  $\Omega(n)$  is the lower bound on the cost of any parallel algorithm for selection.
- Q6. What do you mean by parallel sorting networks? Also discuss the enumeration sort algorithm.
- Q7. Describe the Amdahl's law in detail. Explain the linear, sub linear, super linear and scaled speedup.
- Q8. Discuss and write parallel matrix multiplication algorithm using PRAM model.
- Q9. Using odd-even transposition sort to sort these sequences: Let  $X=(g,h,f,d,e,c,b,a)$ . Assume there are four processors and show each step.

### Section-C

**Note: Attempt any two questions from this section.**

(15×2=30)

(3)

P.T.O.

Q10. 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.

Q11. Let  $A = \{1, 4, 6, 9, 10, 11, 13, 14, 15, 18, 20, 23, 32, 45, 51\}$  be the sequence to be searched. Illustrate the working procedure CREW\_SEARCH for  $x(\text{index value}) = 45$ . Given that  $p$  (no. of processors) = 3 and show each step.

Q12. What is Parallel Alpha Beta search? Explain in detail.

—x—