

FACULTY OF INFORMATICS

B.E. 3/4 (IT) II Semester (New) (Supple.) Examination, December 2009

DESIGN AND ANALYSIS OF ALGORITHMS

Time: 3 Hours]

[Max. Marks: 75

Note : Answer *all* questions from Part A. Answer *any five* question from Part B.

PART – A

(25 Marks)

1. Define Heap. 2
2. What is binary search ? 2
3. Define minimum spanning tree. 2
4. Define optimal solution. 2
5. State travelling salespersons problem. 3
6. What is multistage graph ? 3
7. Write the control abstraction for LC-search. 3
8. Define biconnected component. 3
9. Mention any two applications of Depth First Search. 2
10. What is decision problem ? 3

PART – B

(5×10=50 Marks)

11. a) What is an algorithm ? Explain time and space complexity of an algorithm. 5
- b) Write about Asymptotic Notation. 5
12. a) What is divide and conquer ? Give the control abstraction. 5
- b) Give the algorithm for merge sort using divide and conquer. 5
13. Briefly argue how principle of a optimality holds for 0/1 knapsack problem, generate the sets. S^i , $0 \leq i \leq 4$. Where $(w_1, w_2, w_3, w_4) = (10, 15, 6, 9)$ and $(p_1, p_2, p_3, p_4) = (2, 5, 8, 9)$ – State the purging rules used. If Knapsack capacity is $m = 25$, what is optimal solution ? 10



14. a) Write an algorithm for graph coloring problem ? 5
 - b) Write a recursive backtracking algorithm to find all the Hamiltonian cycles of a given graph. 5
15. a) Write UNION and FIND algorithm. 5
 - b) Explain FIFO branch and bound. 5
16. a) Discuss in detail about the problem of job sequencing with dead lines. 4
 - b) Write algorithm for finding minimum spanning tree of a digraph and explain it with an example. 6
17. Write short notes on :
 - a) Amortized complexity.
 - b) Reliability design.
 - c) Node covering problem.