



**IV Semester B.E. (CSE/ISE) Degree
Examination, December 2017/January 2018
(2K11 Scheme)
CI44 : DESIGN & ANALYSIS OF ALGORITHMS**

Time : 3 Hours

Max. Marks : 100

Instruction : Answer **any five** questions, selecting **atleast two full** questions from **each Part**.

PART – A

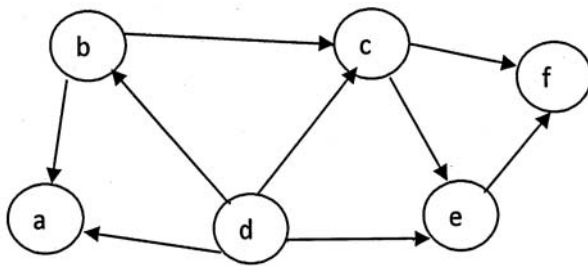
- 1. a) Write an algorithm for computing the Fibonacci numbers. Derive its time complexity. 8
- b) With a neat diagram explain the various steps in algorithmic problem solving. 8
- c) Write a note on Master Theorem used to find the complexity of a given recursion relation. 4
- 2. a) Define Exhaustive Search. Give the solution for the following Assignment problem. 10

Jobs/Person	1	2	3	4	5
A	9	2	7	3	5
B	4	3	5	6	1
C	5	6	4	8	3
D	2	7	4	5	6
E	4	5	3	9	7

- b) Write an algorithm for the following. Give its time complexity. 10
 - i) Brute-Force string Matching
 - ii) Brute-Force Closest-Pair.
- 3. a) Write an algorithm to sort the array in increasing order using Merge Sort. Derive its time complexity. 10
- b) Explain with an example the concept of Multiplication of large integers using divide and conquer technique. Give its Time complexity. 10



4. a) Mention the major variations and give examples for the following : 10
 i) Decrease and Conquer Technique.
 ii) Transform and Conquer Technique.
- b) Sort the following graph using both the methods of Topological order. 10



PART – B

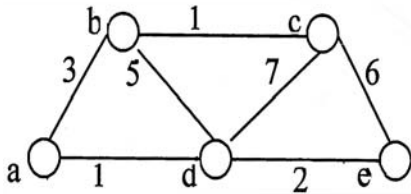
5. a) Explain Horner’s rule. Solve $p(x) = 2x^5 - 4x^3 + 3x^2 + 6$ for $x = -2$ using Horner’s rule. 8
- b) Write a C++ program for Horspool’s String Matching. 8
- c) Write a note on 2-3 trees. 4
6. a) Find whether the graph is connected or not using Warshal’s algorithm for the following Adjacency matrix. Give its applications. 10

	a	b	c	d	e
a	0	1	0	1	0
b	1	0	1	0	1
c	0	1	0	1	0
d	1	0	1	0	1
e	0	1	0	1	0

- b) Write a note on Optimal Binary Search Tree and Knapsack Memory Functions. 10



7. a) Apply Dijkstra algorithm to find the shortest path considering node d as the source in the given graph. Give its time complexity. 10



- b) Write Prim's algorithm to find the Minimum Spanning Tree. Give MST for the above graph. 10
8. a) Give a note on Backtracking. Explain the backtracking subset sum problem and construct a state space tree for; 8
 $S = \{1, 3, 4, 6, 8\}$ and $\text{sum} = 7$
- b) Define : NP Complete, NP Hard and Approximation algorithms. 6
- c) Define N Queens Problem and Construct a state space tree for 4 queen problem. 6
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