Question Paper Code : **71679**

06/06/2017 FN

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Third/Fourth Semester

Computer Science and Engineering

CS 6402 — DESIGN AND ANALYSIS OF ALGORITHMS

(Common to information Technology)

(Regulations 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is an Algorithm?

2. Write an algorithm to compute the greatest common divisor of two **numbers.**

3. Devise an algorithm to make for 1655 using the Greedy strategy. **The coins** available are {1000, 500, 100, 50, 20, 10, 5}.

4. What is closest-pair problem?

5. State the general principle of greedy algorithm.

6. What do you mean by dynamic programming?

7. What do you mean by 'perfect matching' in bipartite graphs?

8. State: Planar coloring graph problem.

9. What is an articulation point in a graph?

10. Define 'P' and 'NP' problems.

PART B — (5 × 13 = 65 marks)

11. (a) Briefly explain the mathematical analysis of recursive and non-recursive algorithm. (13)

Or

(b) Explain briefly Big oh Notation, Omega Notation and Theta Notations. Give examples. (13)

12. (a) What is divide and conquer strategy and explain the binary search with suitable example problem. (13)

Or

(b) Solve the following using Brute-Force algorithm: (13)

Find whether the given string follows the specified pattern and return 0 or 1 accordingly.

Examples :

(i) Pattern: "abba", input: "redblueredblue" should return 1

(ii) Pattern: "aaaa", input: "asdasdasdasd" should return 1

(iii) Pattern: "aabb" input: "xyzabcxzyabc" should return 0.

13. (a) Solve the following instance of the 0 / 1, knapsack problem given the knapsack capacity in $W = 5$ using dynamic programming and explain it. (13)

Items	Weight	Value
1	4	10
2	3	20
3	2	15
4	5	25

Or

(b) Write the Huffman's Algorithm. Construct the Huffman's tree for the following data and obtain its Huffman's Code. (13)

Character	A	B	C	D	E	–
Probability	0.5	0.35	0.5	0.1	0.4	0.2

14. (a) Describe in detail the simplex algorithm methods. (13)

Or

(b) Explain KMP string matching algorithm for finding a pattern on a text, and analyze the algorithm. (13)
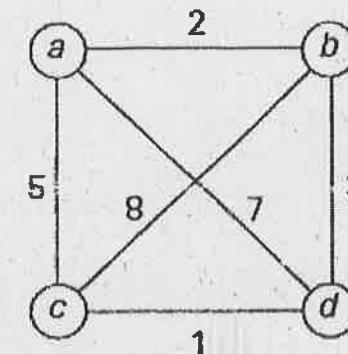
15. (a) Discuss the approximation algorithm for NP- hard problems. (13)

Or

(b) Describe the backtracking solution to solve 8-queens problem. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Apply Branch and Bound algorithm to solve the Travelling Salesman Problem for (15)

Or

(b) Write an algorithm for quick sort and write its time complexity with example list are 5, 3, 1, 9, 8, 2, 4, 7. (15)