Reg No:

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2017
Computer Science and Engineering
CS 6402 — DESIGN AND ANALYSIS OF ALGORITHMS
(Regulations 2013)

Time : Three hours   **Maximum : 100 Marks**

Answer ALL questions
PART A (2 × 10 = 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: "xyzabcxzyzbc" 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	1	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	F
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)
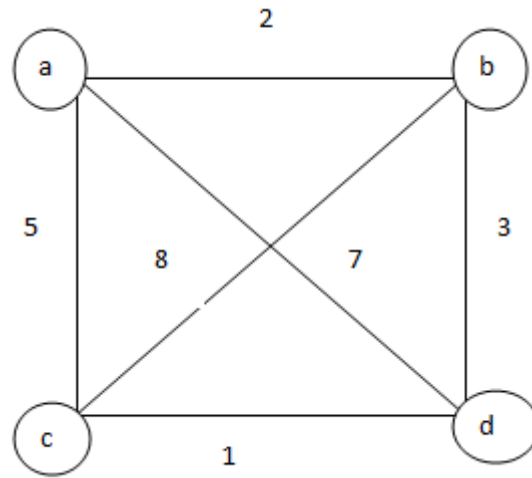

15. (a) Discuss the approximation algorithm for NP hard problems. (13)

(OR)

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

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)