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## Question Paper Code: 71679

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 —  $(10 \times 2 = 20 \text{ marks})$ 

- 1. What is an Algorithm?
- Write an algorithm to compute the greatest common divisor of two numbers.
- 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) |  | siv         |
|     |     | Or   | (10         |
|     | (b) | Explain briefly Big oh Notation, Omega Notation and Theta Notation Give examples.  | ons<br>(13  |
| 12. | (a) |  | with<br>(13 |
|     | 0.3 | Or   |             |
|     | (b) |  | (13)        |
|     |     | Find whether the given string follows the specified pattern and return or 1 accordingly.   | m (         |
|     |     | 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 knapsack capacity in $W=5$ using dynamic programming and explain | the         |
|     |     |  | (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 to following data and obtain its Huffman's Code.                   | the<br>13)  |
|     |     | Character A B C D E -  |             |
|     |     | Probability 0.5 0.35 0.5 0.1 0.4 0.2   |             |
| 4.  | (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)

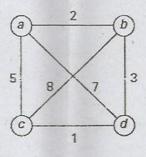
15. (a) Discuss the approximation algorithm for NP- hard problems. (13)

Or

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

PART C —  $(1 \times 15 = 15 \text{ marks})$ 

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)

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