

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY**Fifth Semester of B. Tech (CE) Examination****May 2017****CE315 Design and Analysis of Algorithm****Date: 23.05.2017, Tuesday****Time: 10.00 a.m. To 01.00 p.m.****Maximum Marks: 70****Instructions:**

1. The question paper comprises two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I**Q - 1 Answer the questions below.**

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|-------|---|------|
| (i) | What is Big Oh notation? | [01] |
| (ii) | List out methods to solve recurrence relations. | [03] |
| (iii) | Write an algorithm to find sum of 1 to 100 numbers and find its complexity. | [03] |

Q – 2 (a) Explain Master's theorem. [04]**(b) Answer the questions below (Any Two): [10]**

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|-------|--|--|
| (i) | Explain Selection Sort with analysis. | |
| (ii) | Compare Merge Sort and Quick sort algorithms in terms of complexity. | |
| (iii) | Compare Dynamic and Greedy algorithms. | |

Q - 3 Answer the questions below:

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|-----|---|------|
| (a) | Compare the analysis of Linear and Binary search algorithms. | [04] |
| (b) | Write and explain Kruskal's algorithm with an example. | [05] |
| (c) | Compute Binomial coefficient $C(7,3)$ using dynamic approach. | [05] |

OR**Q – 3 Answer the questions below.**

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|-----|--|------|
| (a) | Solve the following 0/1 knapsack problem using Greedy approach. There are five items whose weights and values are given in following arrays, Weight $w[] = \{ 1,4,5,6,7 \}$ and values $V[] = \{ 1,6,18,22,28 \}$. Find out the optimal knapsack items for weight capacity of 11 units. | [04] |
| (b) | Explain Job scheduling problem with greedy approach. | [05] |
| (c) | Write and explain prim's algorithm with an example. | [05] |

SECTION – II**Q – 4 Answer the questions below.**

- (a) Explain BFS algorithm with example. [03]
- (b) Compare Branch and Bound and Backtracking. [02]
- (c) Define Directed graph, Undirected Graph ,Out-degree and in-degree of graph. [02]

Q – 5 Answer the questions below.

- (a) Explain Rabin-Karp algorithm with example. [05]
- (b) Find the optimal sequence of Matrix chain multiplication using dynamic programming. [05]
 $P = 13 \times 5$, $Q = 5 \times 89$, $R = 89 \times 3$, $S = 3 \times 34$.
- (c) Find solution of n-queen problem for $n=4$. [04]

OR**Q – 5 Answer the questions below.**

- (a) Solve the following Task Assignment problem for minimization. [05]

	Task1	Task2	Task3
Person A	4	7	3
Person B	2	6	1
Person C	3	9	4

- (b) Solve using Large integer multiplication method: 3123×222 [05]
- (c) Define P, NP, NP-complete and NP-hard problem. [04]

Q – 6 Answer the questions below (Any Two) :**[14]**

- (a) Determine the Longest Common Subsequence of given two strings:
 S_1 : ABCDGH
 S_2 : AEDFHR
- (b) Explain 0/1 Knapsack problem using Dynamic Programming with any suitable example.
- (c) Generate Dynamic Programming Algorithm to make a change of 8 rupees if currency denominations are 1,4,and 6. Show complete solution.
