Candidate Seat no…….

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Fifth Semester of B. Tech (CE) Examination

March-April 2018

CE315 Design and Analysis of Algorithm

Date: 29.03.2018, Thursday **Time: 1.30 p.m. To 4.30 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.

(i) Derive the running time of linear search in worst case. **[03]**

(ii) Why analysis of algorithm is important? Define: Average case, Best case and Worst case complexity. **[04]**

Q - 2 (a) Attempt the following: (Any Two) **[10]**

(i) State the Master's theorem with all three cases.

(ii) Write recurrence relation for Merge sort and solve it using recurrence tree method.

(iii) Solve the recurrence relation using iteration method: 2T(n-2)+1

(b) Write and Explain Binary Search algorithm for searching value 45 from the following list: 23,36,45,48,52,58,78,90,95 **[04]**

(c) Find the optimal solution for the following knapsack problem using fractional approach. Capacity of knapsack is 5. **[04]**

Item No.	Weights	Values
1	1	6
2	2	10
3	3	12

OR

(c) Schedule the following jobs to get maximum profit using greedy technique. **[04]**

Job No.	Deadline	Profit
1	3	9
2	2	7
3	3	7
4	1	2

Q – 3 **Answer the questions below.**

(i) Sort the sequence 8, 1, 4, 1, 5, 9, 2, 6, 5 using Quick sort method. **[05]**

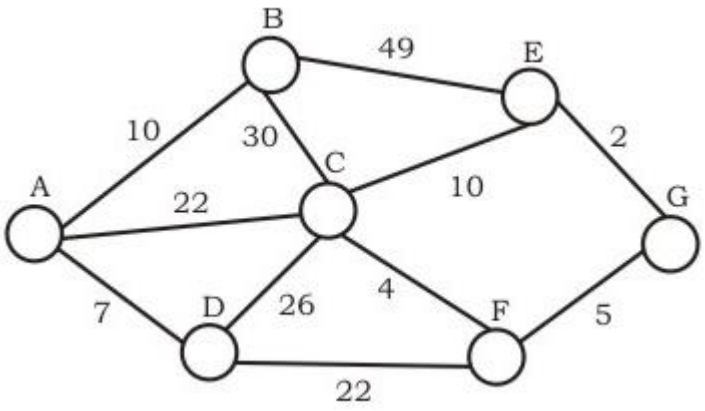
(ii) Does Kruskal's algorithm always give optimal solution? Justify with an example. **[05]**

OR

Q – 3 **Answer the questions below.**

(i) Write and analyze recursive algorithm for finding factorial of a number. **[05]**

(ii) Find the minimum spanning tree for the given graph using prim's algorithm. Consider A as starting vertex. **[05]**



SECTION – II

Q - 4 **Answer the questions below.**

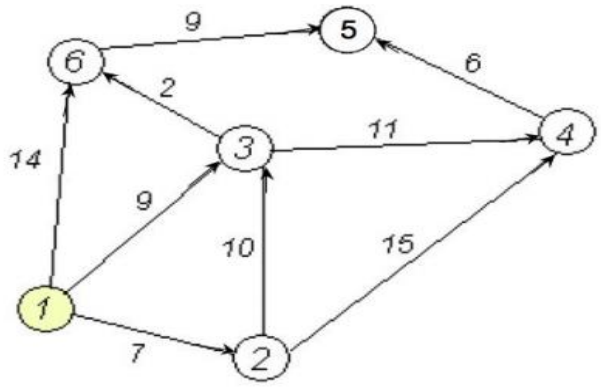
(i) Explain BFS with example. **[03]**

(ii) Compare Backtracking and Branch and Bound technique. **[04]**

Q - 5 (a) Solve the Assignment Problem with the following cost matrix using Branch & Bound Technique. **[05]**

	T1	**T2**	**T3**
P1	2	4	5
P2	2	7	10
P3	5	3	7

Q - 5 (b) Write and Explain Dijkstra's Algorithm for the following graph. Consider 1 as the source vertex. **[05]**



Q - 5 (c) Define the following terms: **[04]**
(i) Cross edge
(ii) Cycle
(iii) Back edge
(iv) Tree edge

OR

Q – 5(a) Define String Matching Problem. Explain any one String matching algorithm. **[05]**

Q – 5 (b) Find the binomial coefficient C(10,8) using dynamic programming. **[05]**

Q – 5 (c) Explain exponential algorithm for finding 7^{23}. **[04]**

Q – 6 **Attempt the following: (Any Two)** **[14]**

(i) Consider that the capacity of the knapsack W = 10 and the item list is(i1,i2,i3,i4). Weights of the items are (5,4,6,3) and values are (10,40,30,50). Solve the 0-1 knapsack problem using Dynamic programming.

(ii) Find the optimal cost using matrix chain multiplication method for the given matrices: A=1*2, B=2*3, C=3*4 ,D=4*3

(iii) Compare Dynamic and Greedy methods for making change problem for following example: Total amount is 15 and available coins are of 1,7,8,9

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