

**DAYANANDA SAGAR UNIVERSITY**USN No: **III Semester BCA Examinations – December 2018 / January 2019**

Course Title: Analysis And Design Of Algorithms

Course Code: 16CA205

Duration: 03 Hours

Date: 31-12-2018

Time: 10:00 AM to 01:00 PM

Max Marks: 60

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- Note:**
1. Answer 5 full questions choosing one from each Section
  2. Each Section carries 12 Marks
  3. Draw neat sketches wherever necessary
  4. Missing Data may be suitably assumed

**SECTION - 1**

- 1.a. With an example explain recurrence relations? (02 Marks)
- 1.b. State the properties of an algorithm. (04 Marks)
- 1.c. Explain the properties of asymptotic notations. (06 Marks)

**OR**

- 2.a. Explain the complexity analysis of Radix sort. (06 Marks)
- 2.b. Explain the complexity analysis of binary search. (06 Marks)

**SECTION - 2**

- 3.a. Write an algorithm to find the maximum and minimum element by using divide and conquer approach. Analyze the algorithm with an example. (06 Marks)
- 3.b. Write an algorithm to perform Quick sort by using divide and conquer approach. Analyze the algorithm with an example. (06 Marks)

**OR**

- 4.a. Solve the knapsack problem using the greedy algorithm. (04 Marks)
- 4.b. What is a Minimum Spanning Tree? Compute the minimum spanning tree for the following graph using Kruskal's algorithm. (08 Marks)

(P.T.O)

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**SECTION - 3**

- 5.a. What is dynamic programming? (02 Marks)
- 5.b. Explain the important properties for the problem that can be solved by dynamic programming. (10 Marks)

**OR**

- 6.a. By using dynamic programming approach write an algorithm to find the all pair shortest path. Also analyze the algorithm. (08 Marks)
- 6.b. Explain the multistage graphs. (04 Marks)

**SECTION - 4**

- 7.a. What is backtracking? (02 Marks)
- 7.b. Explain how to solve the eight queen's problem by using backtracking approach. Draw the solution for the same. (10 Marks)

**OR**

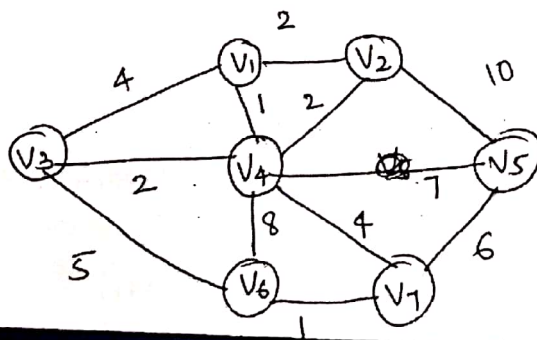
- 8.a. Explain sum of subset problem. (04 Marks)
- 8.b. Explain how to solve the graph coloring problem by using backtracking approach. Draw the solution for the same. (08 Marks)

**SECTION - 5**

- 9.a. Explain the 0/1 Knapsack problem using Branch and Bound algorithm. (06 Marks)
- 9.b. Explain the features of FIFO branch and Bound algorithms. (06 Marks)

**OR**

- 10.a. Explain the Traveling sales person problem with efficiency considerations. (10 Marks)
- 10.b. Explain the features of branch and Bound algorithm. (02 Marks)





Internal Question Paper I

Class: III<sup>rd</sup> Semester, BCA  
Course: Analysis and Design of  
Algorithm  
Course code: 16CA205

Date: 13/09/2019  
Time: 10:00 to 11.30pm  
Max. Marks: 50

**Note:** Answer any FIVE full questions

Q. No.	Questions	Marks
1	a. With the help of a flowchart, explain in detail, the various stages of algorithm design and analysis Process. b. Which of the following are true for large values of n? I. $n^2 \leq n \log n$ II. $n^3 \geq 2^n$ III. $n! \leq 2^n$ IV. $n \leq n \log n$ c. Prove that $T(n) = T(n-1) + n$ is in $\Theta(n^2)$ .	5 2 3
2	a. Explain N, NP, NP-hard and NP-complete problem with an example. b. Give a brief outline of the general procedure analyzing the efficiency of recursive algorithms with an example.	6 4
3	a. Explain the binary searching algorithm in detail, with an example. Show that <u>worst case efficiency</u> of binary search is in $\Theta(\log n)$ . b. Explain the general plan for a recursive algorithm to find factorial of a number. Derive its efficiency.	6 4
4	a. Sort the following set of numbers using merge sort showing all the divide and conquer steps Show that worst case efficiency of Merge Sort. 7 4 2 1 6 9 21 13. b. Solve the following recurrence relation using Substitution method: $T(n) = 3T(n/2) + n^2$	6 4