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(Printed Pages 4)

Roll No. _____

16/243-C

B.C.A. (Fourth Semester) Examination, 2016

First Paper

(BCA-401 : Design and Analysis of Algorithm)

Time Allowed : Three Hours] [Maximum Marks : 75

Note : Attempt **all** sections as per instructions.

Section-A

(Very Short Answer Type Questions)

Note : Attempt **all** questions. Give answer of each question in about **50** words.

1.5×10=15

1. (a) What is meant by Analysis of Algorithm?
- (b) Define θ notation.
- (c) What is Probability?
- (d) What do you mean by searching?
- (e) Write the usefulness of sorting.
- (f) Define Spanning Tree.

P.T.O.

(2)

- (g) What is 0/1 Knapsack problem?
- (h) Define Graph.
- (i) Define Travelling Salesman Problem
- (j) What is Chromatic Number?

Section-B

(Short Answer Type Questions)

Note : Attempt **all** questions. Give answer of each question in about **200** words. $8 \times 5 = 40$

2. Explain Worst case, Average case and Best case efficiencies.

OR

With the help of example explain how a recursive algorithm can be represented by recurrence relation.

3. Write the linear search algorithm and analyse for its best, worst and average case time complexity.

OR

What is the relevance of greedy method to solve Knapsack problem.

4. State the Master theorem and its use.

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(3)

OR

Write the algorithm to find the height of a Binary tree and analyze its efficiency.

5. What is Heap? What are the different types of heaps? Explain how you can construct a heap?

OR

Explain the multistage graph problem with an example.

6. Find the optimal solution to the Knapsack instance $n=7, m=15$

$$(p_1, p_2, p_3, p_4, p_5, \dots, p_7) = (10, 5, 15, 7, 6, 18, 3)$$

and

$$(w_1, w_2, w_3, \dots, w_7) = (2, 3, 5, 7, 1, 4, 1)$$

OR

Explain with example, the Graph Coloring algorithm. <https://www.vbspustudy.com>

Section-C

(Long Answer Type Questions)

Note : Attempt any **two** questions. Give answer of each question in about **500** words.

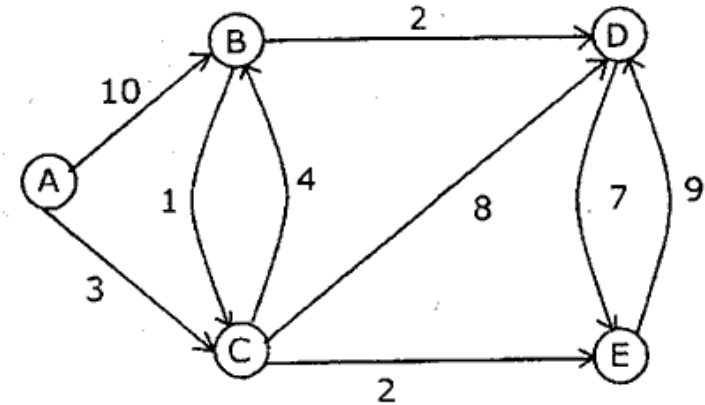
$$10 \times 2 = 20$$

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P.T.O.

(4)

7. Run Dijkstra's algorithm on the following :



8. What do you mean by 8-Queens problems? How is it tackled via a backtracking solution.
9. What are the different ways of designing algorithm? Explain in detail.
10. Sort the following list in increasing order using quicksort technique.
 $A = \langle 5, 5, 9, 4, 10, 2, 2, 1 \rangle$
11. Write short notes on any **two** of the following :
- (a) Coloring of tree
 - (b) Optimal storage on tapes
 - (c) Radix Sort

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