Max. Marks: 100

| (Following Paper ID a | and Roll N | lo. to | be | filled | in | your |
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## B.TECH.

# Regular Theory Examination (Odd Sem - V) 2016-17

DESIGNAND ANALYSIS OF ALGORITHM

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Time: 3 Hours

## Section - A

- 1. Attempt all parts. All parts carry equal marks. Write answer of each part in short.  $(10\times2=20)$ 
  - a) List out the disadvantages of divide and conquer algorithm.
  - b) What are the fundamental steps involved in algorithmic problem solving?
  - c) Write recursive function to find nth Fibonacci number.

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- d) Define Binary heap.
- e) Briefly explain the Prim's algorithm.
- f) Define principle of optimality.

- g) Write the names of various design techniques of algorithm.
- h) Differences between branch & bound and backtracking technique.
- i) What is the running time complexity of 8 queen's problem?
- j) Define P, NP and NP complete in decision problem.

### Section - B

## Attempt any five questions from this section.

 $(5 \times 10 = 50)$ 

- **2.** Explain the concepts of quick sort method and analyze its complexity with suitable example.
- 3. Explain the concept of merge sort with example.
- 4. Insert the nodes 15, 13, 12, 16, 19, 23, 5, 8 in empty Red Black Tree and delete in the reverse order of insertion.

5. Write short note on Dijkstra 's algorithm shortest paths - Dijkstra's algorithm shortest path problems.

- 6. Write pseudocode for 8 queen problem.
- 7. Write non-deterministic algorithm for sorting.
- **8.** What is backtracking? Write general iterative algorithm for backtracking.
- 9. Differentiate NP complete with NP hard.

#### Section-C

Note: Attempt any 2 questions from this section.

 $(2 \times 15 = 30)$ 

- 10. i) State Bellman ford algorithm.
  - Consider following instance for simple knapsack problem. Find the solution using greedy method.

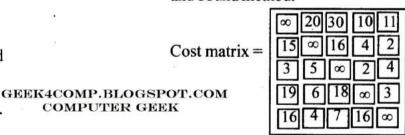
$$N = 8$$

$$P = \{11, 21, 31, 33, 43, 53, 55, 65\}$$

$$W = \{1, 11, 21, 23, 33, 43, 45, 55\}$$

$$M = 110$$

 What is travelling salesman problem? Find the solution of following travelling salesman problem using branch and bound method.



12. Prove that three coloring problem is NP Complete.

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