

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (CSE) (2012 to 2017) (Sem.-5)**  
**DESIGN & ANALYSIS OF ALGORITHMS**  
Subject Code : BTCS-503  
M.Code : 70536

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Answer the following briefly :**

- 1) What is asymptotic notation?
- 2) Define Big Oh.
- 3) What are the steps involved in proving a problem to be NP complete?
- 4) What are the applications of Fast Fourier transform?
- 5) How the Prim's algorithm is better in finding the Minimal spanning tree in comparison to the Kruskal's method?
- 6) What is the time complexity of the algorithm for finding all-pairs-shortest-path problem?
- 7) What are NP class problems?
- 8) What is the minimal spanning tree? What are its advantages?
- 9) What is a deterministic algorithm?
- 10) Distinguish between deterministic and non-deterministic algorithms.

## SECTION-B

- 11) What is the relationship between the classes P and NP? Explain. (5)
- 12) Explain the Big -Oh computation for each of the following control structures : (5)
- a) Sequencing
  - b) If-then-else
  - c) "for" loop
  - c) "While" loop
  - e) Recursion
- 13) What do you analyze in an algorithm? What is the basis of analysis? Explain. (5)
- 14) Explain topological sort with an example. (5)
- 15) What are greedy algorithms? What are their characteristics? Explain any greedy algorithm with example. (5)

## SECTION-C

- 16) Explain the KMP algorithm in detail with an illustrative example. (10)
- 17) Explain in detail quick sorting method. Provide a complete analysis of quick sort. (10)
- 18) Order the following functions by growth rate:  $N$ ,  $N^{1.5}$ ,  $N^2$ ,  $N \log \log N$ ,  $N \log^2 N$ ,  $N \log(N^2)$ ,  $2/N$ ,  $2^N$ ,  $2^{N/2}$ ,  $37$ ,  $N^2 \log N$ ,  $N^3$  Indicate which functions grow at the same rate. (10)

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**