

Roll No.

Total No. of Questions : 09

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B.Tech. (CSE / AI&ML / DS / CE / IOT / CE / CSE / Internet of Things and
Cyber Security including Block Chain Technology /) (Sem.-4)

DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTCS-403-18

M.Code : 77629

Date of Examination : 24-11-2023

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

1. Answer briefly :

- a) What is a minimal spanning tree?
- b) How do you compare the performance of various algorithms?
- c) What is travelling salesperson problem?
- d) Distinguish between deterministic and non-deterministic algorithms.
- e) Give an example of dynamic programming approach.
- f) What are the graph traversal techniques?
- g) Do the greedy algorithms give an optimized solution?
- h) What is the difference between DFS and BFS in terms of traversal of a graph?
- i) What is meant by NP hard and NP-complete problems?
- j) What is the time complexity of the algorithm for finding all-pairs-shortest-path problem?

SECTION-B

2. Compare :

- a) Time vs. Space Complexity
 - b) Polynomial vs. exponential running Time
 - c) Upper vs. Lower Bound
 - d) Shortest path vs. Minimal Spanning tree
3. What are greedy algorithms? What are their characteristics? Explain any greedy algorithm with example.
 4. Define depth-first search. With an algorithm for DFS, discuss its time complexity. Also illustrate with some example.
 5. What is the relationship among P, NP and NP complete problems? Show with the help of a diagram.
 6. What are randomized algorithms? What are their types? What are their advantages? Where these are used? Give an example of randomized algorithm.

SECTION-C

7. Order the following functions by growth rate : N , N^{15} , N^2 , $N \log \log N$, $N \log^2 N$, $N \log(N^2)$, $2/N$, $2N$, $2^{N/2}$, 37 , $N^2 \log N$, N^3 . Indicate which functions grow at the same rate.
8. Define spanning tree. Write Kruskal's algorithm for finding minimum cost spanning tree. Describe how Kruskal's algorithm is different from Prim's algorithm for finding minimum cost spanning tree?
9. Compare the various programming paradigms such as divide-and-conquer, dynamic programming and greedy approach.

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.