Reg. No. : | | | | | | | | | | |

Question Paper Code: 54203

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Computer Science and Engineering

15UCS403- DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2015)

Duration: 1:15hrs Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. What is the best time complexity of Bubble sort? CO1- R

   (a) N^2 (b) N log N (c) N (d) N $(\log N)^2$

2. Desirable characteristic of an algorithm is CO1- R

   (a) Generality (b) Correctness

   (c) Simplicity (d)All of the above

3. Floyd – Warshall algorithm utilizes _____ to solve the all pairs shortest paths problem on a directed graph in _____ time. CO2- R

   (a) Greedy algorithm, $\theta(V^3)$ (b) Greedy algorithm, $\theta(V^2 \lg n)$

   (c) Dynamic programming, $\theta(V^3)$ (d) Dynamic programming, $\theta(V^2 \lg n)$

4. Based on the problem statement and definitions, The straight forward approach is CO2- R

   (a) Exhaustive Search (b) Brute force

   (c) Divide and Conquer (d) Decrease and conquer

5. _____ is simply a brute-force approach to combinatorial problems. CO3- R

   (a) Exhaustive search (b) Permutations

   (c) Hamiltonian circuit (d) None of the above

6. Dynamic programming is similar to the divide-and-conquer approach, then the solution of a large problem depends on CO3- R

(a) Overlapping Sub problems

(b) Sub problems that are completely separate

(c) Previously obtained solutions to sub problems

(d) None of the above

7. The best-known algorithm for the single-source shortest-paths problem, called CO4-R

(a) Dijkstra's algorithm (b) Prims Algorithm

(c) Kruskal's algorithm (d) None of the above

8. Any linear programming problem with a nonempty bounded feasible region has _____ solution. CO4-R

(a)Feasible (b) Optimal (c) Extreme (d) None of these

9. Let X be a problem that belongs to the class NP. Then which one of the following is TRUE? CO5- R

(a) There is no polynomial time algorithm for X.

(b) If X can be solved deterministically in polynomial time, then P=NP.

(c) If X is NP-hard, then it is NP-Complete

(d) X may be undecidable

10. A Non-deterministic algorithm terminates unsuccessfully if and only if CO5- R

(a) There exists no choices for success (b) The result of every operation varies

(c) Stack overflow occurs (d) Sequence of choices available

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Describe briefly the Time complexity estimation, Space complexity estimation and tradeoff between Time and Space complexity CO1- U (8)

12. Write an algorithm to perform binary search on a sorted list of elements. Analyze the algorithm for the best case, average case and worst case. CO2- U (8)

13. Explain the algorithm for computing Binomial Coefficient. CO3- U (8)

14. Consider the following linear programming with two variables. CO4 U (8)

-x+y<=12,

x+y>=30,

2x+y<=90. Calculate the maximum value of z=4x+6y, where

x>=0 and y>=0.

15. Apply Backtracking technique to solve the following instance of subset sum problem: S ={1,3,4,5} and d=11 CO5- U (8)