

Roll No.

3230

**B. Tech. 5th Semester (CSE)
Examination – December, 2022
DESIGN AND ANALYSIS OF ALGORITHMS**

Paper : PCC-CSE-307-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

- 1.** Explain the following : 15
- (a) What is algorithm ? Explain characteristics of algorithms.
 - (b) What is the time complexity of Merge sort and Selection sort ?
 - (c) Explain P and NP class.
 - (d) Explain Divide and Conquer technique.
 - (e) Explain Greedy algorithm.

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- (f) What is multistage graph ?
- (g) Write the applications of Branch and Bound problem.

UNIT – I

- 2. (a) What is Stack ? Explain basic operations of stack and write algorithm of insert and delete. 8
- (b) Define the time complexity. Explain asymptotic notation. 7
- 3. (a) Explain the procedure of Quick sort with an example. Also analyze it in best, average and worst case. 10
- (b) Explain Binary Search with example. What is the complexity of binary search ? 5

UNIT – II

- 4. (a) Explain 0/1 Knapsack. 10

Solve using 0/1 Knapsack with capacity 20 :

Objects	OBJ1	OBJ2	OBJ3
Profit	25	24	15
Weight	18	15	10

- (b) Explain Greedy algorithm. Write its applications. 5
- 5. (a) Define Dynamic programming. Explain travelling Sales man problem by taking suitable example. 10
- (b) Write a short note on fractional knapsack problem. 5

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- UNIT – III**
- 6. (a) Explain Backtracking with algorithm. 7
 - (b) Define N-Queen problem and write all the steps to solve this. 8
 - 7. (a) Discuss branch and bound strategy. 8
 - (b) Explain Travelling Sales man problem using Branch and bound strategy. 7

UNIT – IV

- 8. (a) What is the relationship among P, NP and NP complete problems ? Show with the help of a diagram. 7
- (b) Differentiate between NP hard and NP complete problem. 8
- 9. Explain NP hard and NP completeness of SAT problem. _____ 15

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