2022

B.A./B.Sc.

Fourth Semester

CORE – 8

COMPUTER SCIENCE

Course Code: CSC 4.11

(Design & Analysis of Algorithms)

Total Mark: 70   *Pass Mark: 28*
Time: 3 hours

Answer <u>five</u> questions, taking <u>one</u> from each unit.

UNIT–I

1. (a) What is an algorithm? List the advantages and disadvantages of an algorithm?   1+6=7
    (b) What are the types of analysis? Explain the complexity of an algorithm.
                                                                     7

2. (a) What is a pseudocode? Write the advantages and disadvantages of a pseudocode.   1+6=7
    (b) What are the types of algorithms? List the characteristics of an algorithm.
                                                                     2+5=7

UNIT–II

3. (a) Explain in detail the divide and conquer technique.   7
    (b) Write a note on greedy algorithm.   7

4. (a) Explain dynamic programming in detail.   7
    (b) List and explain briefly the algorithms based on the concept of divide and conquer technique.   7

UNIT–III

5. (a) Explain binary search and linear search algorithm.   7

(b) Write a program to illustrate bubble sort and check its complexity.

7

6. (a) Explain insertion sort and give its time complexity. 7
   (b) Explain merge sort and quick sort with its complexities. 7

UNIT–IV

7. (a) What is a Red-Black tree? List the rules that R-B tree follows.

1+5=6

   (b) Create R-B tree by inserting the following sequence of numbers:
       7,18,5,15,17,25,43,67 8

8. (a) Explain the various rotations in an R-B tree. 6
   (b) Create R-B tree by inserting the following sequence of numbers:
       14,13,8,4,34,25,23,20 8

UNIT–V

9. (a) What is adjacency matrix? List the advantages and disadvantages of adjacency matrix. 1+4=5
   (b) Explain Prim's algorithm with an example. 9

10. (a) What is a graph? Explain the various operations on a graph. 1+4=5
    (b) Explain spanning tree with an example. 9

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