PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - OCT 2023

Semester : Semester III - 2022
Course Code : CSE2007
Course Name : Sem III - CSE2007 - Design and Analysis of Algorithms
Program : B.TECH

Date : 31-OCT-2023
Time : 11:30AM - 1:00PM
Max Marks : 50
Weightage : 25%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE TEN QUESTIONS   **10 X 1=10M**

1. Every Algorithm should produce _____ output
   a) Atlease one   (CO1) [Knowledge]
   b) May produce zero number of outputs
   c) Both (a) and (b) are correct
   d) None

2. In analysis of non-recursive algorithm, 4th step is _____
   a) Writing the number of times the basic operation is executed in terms of some   (CO1) [Knowledge]
      expression
   b) Writing the number of times the basic operation is executed in terms of sum expression
   c) Writing the number of times the basic operation is executed in terms of recursive equation
   d) Writing the number of times the basic operation is executed in terms of non-recursive equation

3. At maximum, number of times comparison operation is executed in a linear search algorithm is
   _____
   a) n   (CO1) [Knowledge]
   b) n-1
   c) n^2
   d) n!

4. Every recursive equation should have appropriate _____
   a) Initial Condition   (CO1) [Knowledge]
   b) Terminal Condition
   c) Base Condition
   d) All the above are same

5. How many comparison operations are executed in each pass of the selection sort?
   a) n   (CO2) [Knowledge]
   b) (n-1) !
   c) n-1
   d) None

6. Time complexity of bubble sort is _____
   a) n   (CO2) [Knowledge]
   b) n-1
   c) n^3
   d) n^2

7. Time complexity of brute force string matching algorithm at the best case is _____
   a) 1   (CO2) [Knowledge]
   b) m
   c) n
   d) m.n

8. Time Complexity of knapsack problem is _____
   a) n !   (CO2) [Knowledge]
   b) (n-1) !
   c) 2 to the power of n
   d) None

9. Exhaustive search uses _____ Technique
   a) Brute Force   (CO2) [Knowledge]
   b) Divide and Conquer
   c) Both
   d) None

10. General recurrence relation of an divide and conquer technique is ----------------------------
    a) T(n)=a.T(n/a) + f(n)   (CO3) [Knowledge]
    b) T(n)=b.T(n/b) + f(n)
    c) T(n)=a.T(n/b) + f(n)
    d) T(n)=b.T(n/a) + f(n)

PART B

ANSWER ALL THE FOUR QUESTIONS   4 X 5 = 20M


11. Define the following.
    a) Basic Operation
    b) Order of Growth
    c) Asymptotic Notations

                                                                         (CO1) [Comprehension]

12. List the steps used to analyse the recursive algorithm mathematically.

                                                                         (CO1) [Comprehension]

13. Write an algorithm which sorts the given set of elements based on elements using brute force technique

                                                                         (CO2) [Comprehension]

14.

Define Travelling Salesperson Problem. Apply the same to the following graph to obtain the shortest tour.

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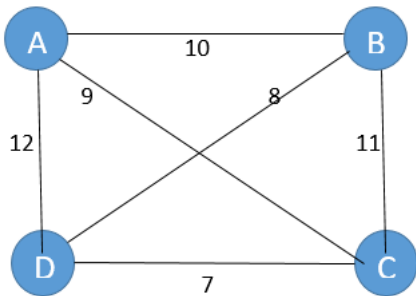
(CO2) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS   2 X 10 = 20M

15. List the steps required to analyze the recursive algorithms in general. Give one example for the same and write its algorithm.

(CO1) [Application]

16. Given a text of n characters and a pattern of m characters. Write an algorithm to search for the given pattern in th given text using brute force technique. Also do the analysis for the same

(CO2) [Application]