Reg. No. :.

Question Paper Code: 94203

B.E. / B.Tech. DEGREE EXAMINATION, AUGUST 2021

Fourth Semester

Computer Science and Engineering

19UCS403 – DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2019)

Duration : 1:45 hrs   Maximum : 50 Marks

PART A – (10 X 2 = 20)

(Answer any Ten of the Following Questions)

1.	Describe the Characteristics of algorithm with an example?	(CO1-U)
2.	What is Asymptotic Notation?	(CO1-U)
3.	Write the Pseudo code for finding the factorial of given number	(CO1-U)
4.	What do you mean by order of Algorithm?	(CO1-U)
5.	What is binary search?	(CO2-U)
6.	Distinguish between deterministic and non-deterministic algorithms	(CO2-U)
7.	What do you mean by Maximum and minimum element problem	(CO2-U)
8.	Define Optimality	(CO3-U)
9.	What is Dynamic Programming?	(CO3-U)
10.	List the advantage of Huffman's encoding?	(CO4-U)
11.	Define Bipartite Graph	(CO4-U)
12.	Write a short note on Classes of NP-Complete	(CO5-U)
13.	Prove that if NP ≠ CO-NP, then P ≠ NP	(CO5-AP)
14.	What is State Space Search?	(CO5-U)
15.	What is backtracking?	(CO5-U)

PART B – (3 X 10 = 20)

(Answer any Three of the Following Questions)

16. Consider the following algorithm. (CO1-Apply)(10)

ALGORITHM Secret(A[0..n − 1])
//Input: An array A[0..n − 1] of n real numbers
minval ← A[0]; maxval ← A[0]
for i ← 1 to n − 1 do
      if A[i] <minval
             minval ← A[i]
      if A[i] >maxval
             maxval ← A[i]
returnmaxval − minval
    a. What does this algorithm compute?
    b. What is its basic operation?
    c. How many times is the basic operation executed?
    d. What is the efficiency class of this algorithm?
    e. Suggest an improvement, or a better algorithm altogether, and indicate its efficiency class. If you cannot do it, try to prove that, in fact, it cannot be done.

17. Write the algorithm for Merge sort. Provide a complete analysis for the given set of numbers 12, 33,23,43,44,55,64,77 and 76. (CO2-AP)(10)

18. Write OBST algorithm to find optimal solution and solve the below problem and give the tree structure which has lowest expected cost. (CO3-AP)(10)
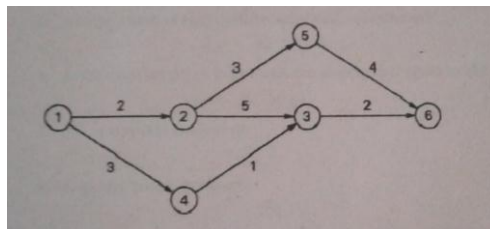
Character	A	B	C	D	_
Probability	0.4	0.1	0.2	0.15	0.15

19. (i) Generate the Huffman code for the following data compromising of alphabet and their frequency a:1 b:1 c:2 d:3 e:5 f:8 g:13 h:21 (CO4-AP)(5)

    (ii) Apply the PRIMS algorithm to find the shortest path for the given graph. (CO4-AP)(5)

20. Given a graph G = (V, E) find the Hamiltonian Circuit using Backtracking approach. Start the search from the arbitrary vertex 'a'. (CO5-AP) (10)