PAPER ID-310214

Subject Code: KCS503

Roll No:

BTECH

(SEM V) THEORY EXAMINATION 2023-24

DESIGN AND ANALYSIS OF ALGORITHM

TIME: 3 HRS

M.MARKS: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

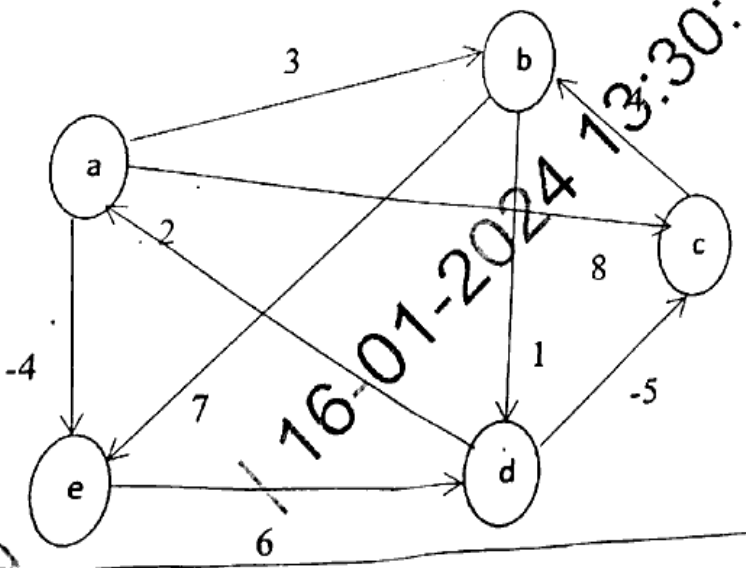
SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

Q no.	Question
a.	What do you mean by algorithm? Write the characteristic of algorithm.
b.	Show that equation are correct : $10n^2+9 = O(n^2)$
c.	Write short note on Fibonacci Heap.
d.	Explain Binary Search Tree.
e.	Define fractional Knap-Sack problem.
f.	Write name of Spanning tree algorithm with complexity.
g.	Define the term "Graph Coloring".
h.	What do you mean by Activity selection problem?
i.	What do you mean by Boyer-Moore Algorithm?
j.	Write short note on Fast Fourier Transform.

SECTION B

2. Attempt any *three* of the following: 10x3=30

a.	Sort the following array by counting sort A={2,5,3,0,2,3,0,3}
b.	Prove all the four properties of Binomial Tree.
c.	Describe DFS with its algorithm. How DFS can be used to solve the problem.
d.	Apply Floyd-Warshall algorithm for constructing shortest path 
e.	Write short notes on the following: i) Randomized Algorithm. ii) Approximation algorithm.

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3. Attempt any *one* part of the following: **10x1=10**

a.	What is stable sorting algorithm? Which of the sorting algorithms we have seen are stable and which are unstable? Give name with explanation.
b.	Write an algorithm of merge sort and prove its worst time complexity.

4. Attempt any *one* part of the following: **10x1=10**

a.	Insert the following elements using the property of RB tree. 61,58,51,32,39,29
b.	Explain B-Tree and its properties. Also write B-Tree deletion cases with example.

5. Attempt any *one* part of the following: **10x1=10**

a.	Determine an LCS of X={A,B,C,B,D,A,B} and Y={B,D,C,A,B,A}
b.	Explain Backtracking. Let set S= {1,3,4,5} and X=8, we have to find subset sum problem using backtracking approach.

6. Attempt any *one* part of the following: **10x1=10**

a.	Write an algorithm of Dijkstra and implement it by taking any example.
b.	Apply Branch and Bound technique to solve travelling salesman problem for the graph whose cost matrix given below:

Cost matrix=

∞	17	13	22	18
13	∞	16	24	19
15	18	∞	16	28
19	13	15	∞	21
28	24	19	18	∞

7. Attempt any *one* part of the following: **10x1=10**

a.	Explain P, NP, NP Hard and NP Complete Classes with example.
b.	Explain KMP matcher and also implement it by an algorithm, *where* P=a,a,b,a,b,b,a and T=b,a,b,a,a,b,a,b,b,a