VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science and Engineering

Winter Semester 2023-2024

Continuous Assessment Test – II

Programme Name & Branch : **B.Tech – (BCB/BCE/BCI/BCT/BDS/BKT)** **SLOT :A1+TA1**

Course Name & code : **BCSE204L – Design and Analysis of Algorithms**

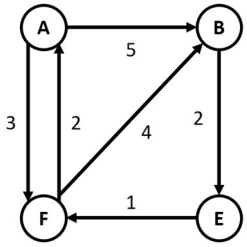
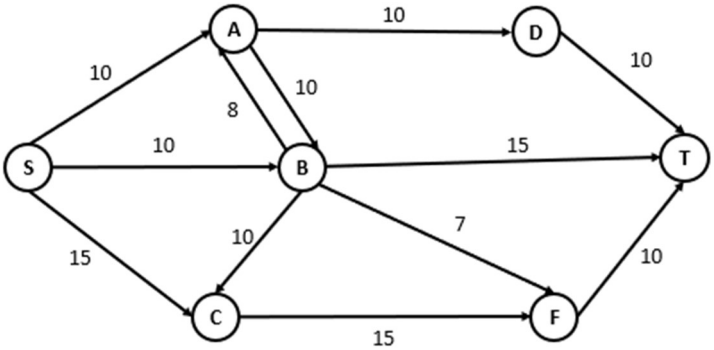
Class Number (s) : **ALL**

Faculty Name : **ALL**

Exam Duration : **90 Min.** **Maximum Marks: 50**

ANSWER ALL THE QUESTIONS(5X10=50 Marks)

Q.No	Question	Max Mark
1	Solve the Knapsack Problem using FIFOBB, assume knapsack capacity is W =8. Show how queue is used for node creation in the state space tree. Item | Profit | Weight 1 | 13 | 4 2 | 15 | 2 3 | 14 | 4 4 | 16 | 6	10
2	Find the existence of a pattern P in the given string S (assign digits A-C as 0-2), using Rabin Karp algorithm. For hash function use Mod 13. Find out how many spurious hits does the algorithm encounter in the **Text =ABCBBCABCBAAABCCAACB** when looking for the pattern **Pattern = CCA**?	10
3	Consider a logistics manager tasked with optimizing transportation routes for a delivery company that operates in a city with a complex network of roads. Your goal is to minimize the distance for packages to reach their destinations by finding the shortest paths between all pairs of locations. The transportation route is represented as weighted directed graph given below. Find the shortest paths between all pairs of locations, considering the varying distance, which helps company to delivery operation.	10

		
4	In water distribution systems, we need to find the maximum amount of water that can be supplied from source S to destination T through a network pipes with capacity limitations. Given a directed graph G=(V,E) representing a water distribution system, where V is set of vertices and E is the set of edges, each edge (u,v) has a capacity c(u,v) representing the maximum water flow that can be supplied through the network pipe. Use Push Relabel algorithm to find the maximum water flow that can be supplied from node S to node T using given graph. 	10
5	Find whether the following line segments intersect or not using cross product. a. L1 :{**(1,23) & (10,15)**} and L2 :{**(4,10) & (6,20)**} b. L3 :{**(4,5) & (7,10)**} and L4 :{**(1,1) & (5,5)**} c. L5 :{**(1,1) & (10,10)**} and L6 :{**(3,3) & (5,5)**} d. L7 :{**(1,1) & (10,10)**} and L8 :{**(5,8) & (3,3)**}	10