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

School of Computer Science and Engineering

Winter Semester 2022-2023 Continuous Assessment Test – II

SLOT :G1+TG1

Programme Name & Branch : **B.Tech - CSE**

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

Class Number (s) :

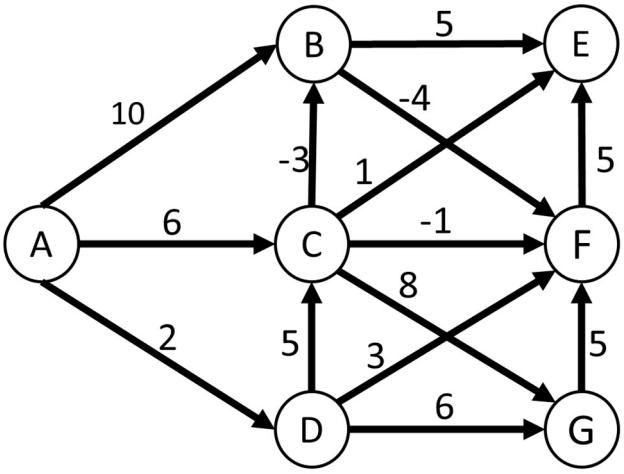
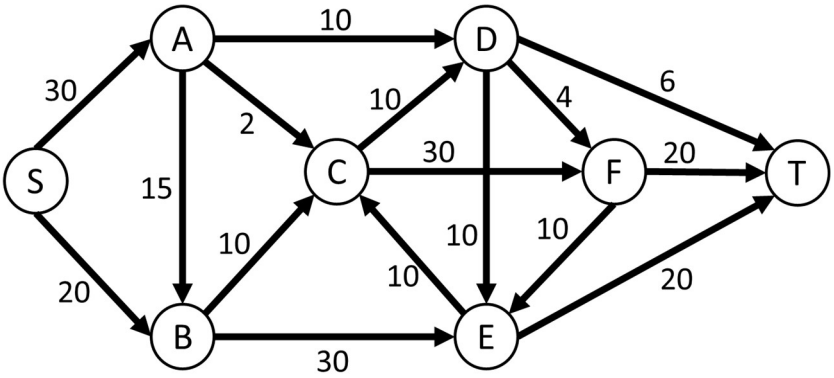
Exam Duration : **90 Min.** **Maximum Marks: 50**

ANSWER ALL THE QUESTIONS(5X10=50 Marks)

<table>
<tr><th>Q.No</th><th>Question</th><th>Module</th><th>Max Mark</th></tr>
<tr><td>1</td><td>What is the difference between FIFOBB and LIFOBB? Solve the Knapsack Problem using LIFOBB, Assume knapsack capacity is W =8. Show how stack is used for node creation in the state space tree using variable tuple representation.

<table>
<tr><th>Item</th><th>Profit</th><th>Weight</th></tr>
<tr><td>1</td><td>3</td><td>3</td></tr>
<tr><td>2</td><td>4</td><td>2</td></tr>
<tr><td>3</td><td>5</td><td>3</td></tr>
<tr><td>4</td><td>6</td><td>5</td></tr>
</table>
</td><td>2</td><td>10</td></tr>
<tr><td>2</td><td>Solve the Job Sequencing Problem using FIFOBB. Select optimal subset J with an optimal penalty for the following data. What will be the penalty corresponding to the optimal solution? Discuss how queue is used in the state space tree using fixed tuple representation.

<table>
<tr><th>Job</th><th>Penalty</th><th>Deadline Time</th><th>Execution Time</th></tr>
<tr><td>1</td><td>40</td><td>2</td><td>1</td></tr>
<tr><td>2</td><td>10</td><td>4</td><td>2</td></tr>
<tr><td>3</td><td>60</td><td>2</td><td>2</td></tr>
<tr><td>4</td><td>30</td><td>3</td><td>1</td></tr>
</table>
</td><td>2</td><td>10</td></tr>
<tr><td>3</td><td>Using a string matching algorithm which uses hashing functions, how many spurious hits does the algorithm (with q to be 11) encounter in the Text =ABCBBCABCBA when looking for the pattern Pattern = CBA?</td><td>3</td><td>10</td></tr>
</table>

4	John is driving his electric car from Vellore and has planned to visit tourist places around Vellore. Due to limitations of charging on the road, he needs to find the shortest path from Vellore to all other chosen tourist places, through. The road map with tourist places between Vellore and tourist places is given as a weighted directed graph G = (V,E) along with weights w (representing the distance). Find the shortest path from source vertex A (i.e., Vellore) to all other vertices (i.e., to all other visiting place around Vellore) using suitable algorithm for the given graph. Write the pseudocode of your algorithm.  	4	10
5	In a wireless network, node S wishes to send some packets to node T, but S and T are not directly connected. We need to find the path that can transfer the most packets from node S to node T, while satisfying the capacity constraints of the edges. The network is represented as a graph, G = (V,E). Design an algorithm with complexity $O(VE^2)$, and find the maximum number of packets transfered from node S to node T using the given graph.  	4	10