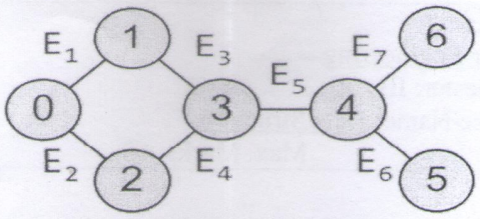
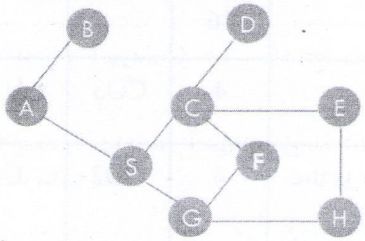
K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Subject Code: CEC303 Subject Name: Data Structure Date: 30/05/202

May-June 2023
(B.Tech) Program: Computer Engineering
Examination: SY Semester: III
Course Code: CEC303 and Course Name: Data Structure
Duration: 2.5 Hours Max. Marks: 60

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	**Solve any six questions out of eight:**	**12**		
i)	Explain any four terms related to a tree data structure	2	CO4	R
ii)	For a queue using arrays, write the algorithm for the dequeue operation	2	CO2	R
iii)	Write the algorithm for deleting the first node in a linked list	2	CO3	R
iv)	Derive the expression tree for the following algebraic expression: (a + (b/c)) * ((d/e) – f)	2	CO4	A
v)	Explain a directed graph and an undirected graph with suitable diagram	2	CO5	R
vi)	Explain division method of hashing	2	CO6	A
vii)	Write the algorithm for push	2	CO2	R
viii)	Draw the BST for the following data. 10,8,15,12,13,7,9,17,20,18,4,5	2	CO4	R
Q.2	**Solve any four questions out of six.**	**16**		
i)	Write the algorithm to print the number of nodes in a linked list	4	CO3	U
ii)	What is recursion. Explain with the help of a factorial problem. How is the stack affected?	4	CO2	U
iii)	If I have the list of numbers 5,78,34,23,45,27 then and I want to add 68 to the list, show the operations if you are using 1) queue,2) circular queue	4	CO2	An
iv)	Create a Binary Search Tree for the following sequence and write the post order traversal sequences from resultant BST: 55,29,56,12,44,88,22,10,69,54,77,92.	4	CO4	A

v)	Give adjacency matrix for the following graph 	4	CO5	R
vi)	Given the following frequencies for characters, find the Huffman Tree A: 10, S: 16, T: 2, E: 25, R: 12	4	CO4	U
Q.3	**Solve any two questions out of three.**	**16**		
i)	Evaluate the following postfix expression using stack. Show the steps and contents on the stack at every step. 15-((6*5)-3)/9	8	CO2	A
ii)	Explain linear queue and circular queue with suitable example. Give the advantages of circular queue over linear queue.	8	CO2	A
iii)	Elaborate the different classifications of data structures.	8	CO1	A
Q.4	**Solve any two questions out of three.**	**16**		
i)	Construct the AVL tree for the following data by inserting each of the following data item one at a time: 12, 45, 23, 21, 56, 33. Show the tree after each insertion with balance factors.	8	CO4	A
ii)	Apply BFS algorithm to the graph given below. Show the steps clearly. Construct the tree obtained after BFS 	8	CO5	A
iii)	Consider a hash table of size 10. Using linear probing, insert the keys 82, 27, 36, 24, 63, 81, 92, and 201 into the table. Let the size of hash table be 10	8	CO6	A

****