

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

Subject Code: CEC303

Subject Name: DATA STRUCTURE

Date: _____

28/2/24

Supplementary Exam Feb-March 2024

(B.Tech) Program: Computer Engineering

Examination: SY Semester: III

Course Code: CEC303 and Course Name: DATA STRUCTURE

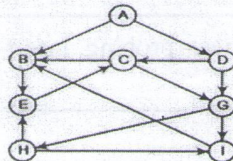
Duration: 2.5 Hours

Max. Marks: 60

Instructions:

(1) All questions are compulsory. (2) Draw neat diagrams wherever applicable. (3) Assume suitable data

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	Explain the operations performed on data structures?	2	CO1	U
ii)	What do you understand by queue overflow and underflow?	2	CO2	U
iii)	Explain circular queue with the help of a neat diagram?	2	CO2	U
iv)	Explain polynomial representation using singly linked list	2	CO3	U
v)	Explain the concept of tree terminologies for Binary tree	2	CO4	U
vi)	Discuss the concept of B trees.	2	CO4	U
vii)	How are graphs represented inside a computer's memory?	2	CO5	U
viii)	Explain the significance of hashing	2	CO6	U
Q.2	Solve any four questions out of six.	16		
i)	Draw the stack structure in each case when the following operations are performed on an empty stack. (a) Add X,Y,Z,A,B,C (b) Delete two letters (c) Add G (d) Add H (e) Delete four letters (f) Add I	4	CO2	A
ii)	Construct a binary search tree for following elements. Show step wise execution. 25,42,15,78,90,11,65,48,64,23,45	4	CO3	A
iii)	Construct B tree for the following elements with M=3 10,23,9,54,12,9,25	4	CO4	U
iv)	Consider the graph given below. Find out its depth-first traversal	4	CO5	A



v)	<p>Consider the queue given below which has FRONT = 1 and REAR = 5. Now perform the following operations on the queue: (a) Add F (b) Delete two letters (c) Add G (d) Add H (e) Delete four letters (f) Add I</p> <table border="1" style="margin-left: 20px;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">A</td> <td style="width: 20px; height: 20px; text-align: center;">B</td> <td style="width: 20px; height: 20px; text-align: center;">C</td> <td style="width: 20px; height: 20px; text-align: center;">D</td> <td style="width: 20px; height: 20px; text-align: center;">E</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6</td> <td style="text-align: center;">7</td> <td style="text-align: center;">8</td> <td style="text-align: center;">9</td> </tr> </table>		A	B	C	D	E					0	1	2	3	4	5	6	7	8	9	4	CO2	A
	A	B	C	D	E																			
0	1	2	3	4	5	6	7	8	9															
vi)	<p>Given a hash table of 100 locations, calculate the hash value using folding method for keys 5678, 321, and 34567</p>	4	CO2	A																				
Q.3	Solve any two questions out of three.	16																						
i)	<p>Explain the types of Data structures with a neat diagram</p>	8	CO2	U																				
ii)	<p>Convert infix into postfix expression X-Y/Z-(A*B/C) /D *E</p>	8	CO2	A																				
iii)	<p>Consider a Singly linked list shown below</p> <pre> graph LR START --> N1[1] N1 --> N2[7] N2 --> N3[3] N3 --> N4[4] N4 --> N5[2] N5 --> N6[6] N6 --> N7[5] N7 --> X[X] style X fill:none,stroke:none </pre> <p>Insert a new node with value 10 at the beginning of the list Insert a new node with value 9 at the end of the list Show step wise insertion</p>	8	CO3	A																				
Q.4	Solve any two questions out of three.	16																						
i)	<p>Insert the following elements in an AVL tree. 25, 44, 58, 15, 19, 11, 37, 32. Mention different rotations that can be used.</p>	8	CO4	A																				
ii)	<p>Consider a directed acyclic graph G given below</p> <pre> graph LR A((A)) --> B((B)) B --> C((C)) B --> D((D)) C --> E((E)) D --> E G((G)) --> D E --> F((F)) </pre> <p>Adjacency lists A: B B: C, D, E C: E D: E E: F G: D</p> <p>Find a topological sorts T of G.</p>	8	CO5	A																				
iii)	<p>Consider a hash table with size = 10. Using linear probing, insert the keys 72,27,36,24,63,81,101 and 92</p>	8	CO4	A																				
