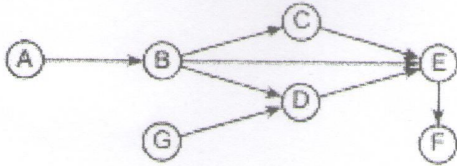


Nov – Dec 2022 (B.Tech) Program: Computer Engineering Examination: SY Semester: III Course Code: CEC303 and Course Name: DATA STRUCTURE Duration: 2.5 Hours Max. Marks: 60				
Instructions: (1) All questions are compulsory. (2) Draw neat diagrams wherever applicable. (3) Assume suitable data, if necessary.				
		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	Explain the concept of Abstract data type?	2	CO1	U
ii)	What do you understand by stack overflow and underflow?	2	CO2	U
iii)	What is a priority queue? Give its applications.	2	CO2	U
iv)	Make a comparison between a linked list and a linear array. Which one will you prefer to use and when?	2	CO3	U
v)	Explain the concept of Binary search trees	2	CO4	U
vi)	Discuss the concept of AVL trees	2	CO4	U
vii)	How are graphs represented inside a computer's memory?	2	CO5	U
viii)	Compare and Contrast Linear search and Binary search algorithm	2	CO6	U
Q.2	Solve any four questions out of six.	16		
i)	What is collision? Explain the various techniques to resolve a collision. Which technique do you think is better and why?	4	CO6	A
ii)	Explain the graph traversal algorithms in detail with example.	4	CO5	U
iii)	Explain the concept of B tree with an example	4	CO4	U
iv)	Explain the operations performed on Singly Linked List	4	CO3	U

v)	<p>Consider the queue given below which has FRONT = 1 and REAR = 5.</p> <table border="1" style="margin-left: 20px;"> <tr> <td></td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td></td><td></td><td></td><td></td> </tr> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td> </tr> </table> <p>Now perform the following operations on the queue:</p> <p>(a) Add F (b) Delete two letters (c) Add G (d) Add H (e) Delete four letters (f) Add I</p>		A	B	C	D	E					0	1	2	3	4	5	6	7	8	9	4	CO2	Ap																			
	A	B	C	D	E																																						
0	1	2	3	4	5	6	7	8	9																																		
vi)	<p>Draw the stack structure in each case when the following operations are performed on an empty stack.</p> <p>(a) Add A, B, C, D, E, F (b) Delete two letters (c) Add G (d) Add H (e) Delete four letters (f) Add I</p>	4	CO2	Ap																																							
Q.3	Solve any two questions out of three.	16																																									
i)	Convert it into postfix expression $A+(B*C-(D/E^F) *G) *H$	8	CO2	Ap																																							
ii)	Write an algorithm to perform the enqueue and dequeue operations in a queue. Give suitable example.	8	CO2	U																																							
iii)	<p>Consider a doubly linked list shown below</p> <table border="1" style="margin-left: 20px;"> <tr> <td>X</td><td>1</td><td></td><td>↔</td><td></td><td>7</td><td></td><td>↔</td><td></td><td>3</td><td></td><td>↔</td><td></td><td>4</td><td></td><td>↔</td><td></td><td>2</td><td>X</td> </tr> <tr> <td colspan="2">START</td><td colspan="18"></td> </tr> </table> <p>Insert a new node with value 5 at the beginning of the list Insert a new node with value 9 after node with value 3. Show step wise insertion</p>	X	1		↔		7		↔		3		↔		4		↔		2	X	START																				8	CO3	Ap
X	1		↔		7		↔		3		↔		4		↔		2	X																									
START																																											

Q.4	Solve any two questions out of three.	16		
i)	Consider a hash table with size = 10. Using quadratic probing, insert the keys 27, 72, 63, 42, 36, 18, 29, and 101 into the table. Take $c_1 = 1$ and $c_2 = 3$.	8	CO6	Ap
ii)	<p>Consider a directed acyclic graph G given below</p>  <p><u>Adjacency lists</u> A: B B: C, D, E C: E D: E E: F G: D</p> <p>Find a topological sort T of G.</p>	8	CO5	Ap
iii)	<p>Create a Huffman tree with the following data</p> <p>A 7 B 9 C 11 D 14 E 18 F 21 G 27 H 29 I 35 J 40</p>	8	CO4	Ap
