



Dec 2018: END SEMESTER ASSESSMENT (ESA) B.TECH. III Semester

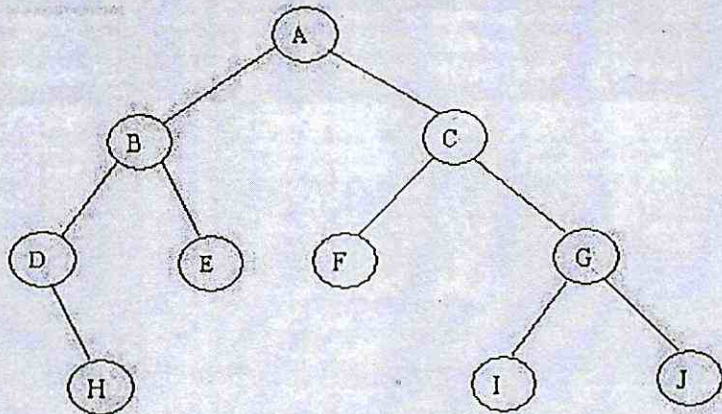
## UE17CS202- Data Structures

Time: 3 Hrs

Answer all questions preferably in the same order

Max Marks: 100

**NOTE: Detailed algorithm or C code is acceptable. Show all steps and State any assumptions made.**

1	a)	Give 2 reasons of preferring an array over a list. Similarly, give 2 reasons when list is preferred over an array?	4
	b)	Explain how polynomial arithmetic of single variable can be implemented using singly linked list. (i) Specify structure of each node of the list.(ii) Show with an example of how polynomial addition and multiplication operations can be performed using linked list.	8
	c)	Specify the DNODE structure of an integer doubly-linked list (dll). Write a function to delete a node based on the specified index position in the dll. (0 should delete the head node, 1 should delete node after the head and so on). Make sure you handle all boundary conditions.	8
2.	a)	Convert the following infix expression to its equivalent postfix and prefix expressions. Write the equivalent binary expression tree.  $A * (B + D) / E - F * (G + H / K)$	6
	b)	Write a method that will take two sorted stacks A and B (min on top) and create one stack that is sorted (min on top). You are allowed to use only the stack operations such as pop, push, empty, size and top. Other than stacks, no other data structures such as arrays are allowed.	6
	c)	Implement enqueue and dequeue operations of a circular queue using an array of size N. Assume f is the index to the front element of the queue and r is index where the next element gets inserted into the queue. Implement any other auxiliary function that may be needed.	8
3.	a)	Write down the pre-order and post-order traversals of the following binary tree.   <pre> graph TD     A((A)) --- B((B))     A --- C((C))     B --- D((D))     B --- E((E))     D --- H((H))     C --- F((F))     C --- G((G))     G --- I((I))     G --- J((J)) </pre>	4
	b)	Write a function that can find the number of connected components in a graph using depth first	8



[illegible]

**There are two connected components in above undirected graph**

8

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