DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Computer Engineering **Sem: III**

Subject Name: Data Structures **Subject Code:** BTCOC303

Max Marks: 60 **Date: 5/12/2018** **Duration: 3 Hrs.**

Instructions to the Students:

1. *Solve **ALL** questions.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

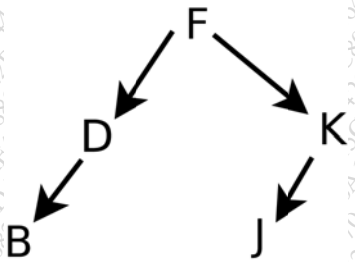
		(Level/CO)	Marks
Q. 1	**Solve Any Three of the following.**		
A)	What is data structure? Why to study data structure? Enlist the five areas of computer science in which data structure is used.	Understand	**4**
B)	What is garbage collection? Who will run garbage collection program? When it will be run?	Understand	**4**
C)	Suppose multidimensional arrays A and B are declared using A (0:5, -2:7) and B (0:5, -1:4). Find the length of each dimension and the number of elements in array A and B.	Apply	**4**
D)	What is primitive data structure? Enlist the differences between primitive and non-primitive data structures.	Understand	**4**
Q.2	**Solve Any Two of the following.**		
A)	What is circular queue? Let the following circular queue can accommodate maximum six elements with the following data, front = 2, rear = 4 and initial queue content is queue = ----, L, M, N, –---, –-- Show the queue content with front and rear value after the following operations. i) Insert A ii) Delete iii) Insert B iv) Delete	Apply	**6**
B)	What is singly linked list? Write algorithm to find the number of times a given ITEM occurs in the singly linked list.	Creating	**6**
C)	Let the keys: 46, 34, 42, 23, 52, 33 are inserted into an empty hash tableusing function h (key) = key mod 10. Give hash table content after every insertion, if open addressing with linear probing is used to deal with collision.	Creating	**6**
Q. 3	**Solve Any Two of the following.**		
A)	What is selection sort? Sort the number following numbers in ascending order and also show the worst case time complexity of selection sort is O (n^2).	Analyzing	**6**
B)	Consider the stack of size 6 memory cells. Suppose initially stack contains **a, b, c, d, e** (Top of stack). Then the following operations are executed	Evaluating	**6**

in order. Show the stack top and any other situation raised while doing each of the operation.
i) Push(f) ii) Pop(top) iii) Push(g) iv) Push(h) v) Pop(top) vi) Push(i)

		Apply	
C)	Explain how to implement two stacks in one array A[1 . . N] in such a way that neither stack overflow unless the total number of elements in both the stacks together is N. Note that, Push() and Pop() operations should be run in O (1) time.		**6**

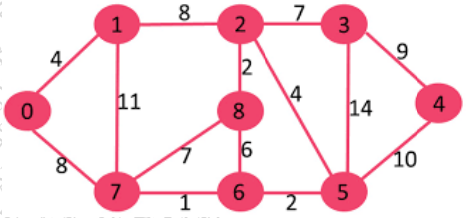
Q.4 Solve Any Two of the following.

A)	What are the different types of the linked list? Give advantages and disadvantages each of the linked list over another.	Remember	**6**
B)	Assume, the following letters are inserted into an empty binary search tree in given order. J, B, D, F, N, K, O. Construct binary search tree and also give height of the tree.	Apply	**6**
C)	What is threaded binary trees? Give the threaded binary tree of the following binary tree.	Apply	**6**



Q. 5 Solve the following.

A)	What is graph? Find the shortest path using Dijkstra algorithm. Assume starting node is 0.	Evaluating	**6**



B)	Explain the in brief the following i) red black tree ii) m-way search tree iii) b tree iv) b+ tree v) sparse matrix vi) AVL tree	Understand	**6**

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