*Please check that this question paper contains 09 questions and two printed pages within first ten minutes.*

[Total No. of Questions: 09] [Total No. of Pages: 02 ]

Uni. Roll No. .....

**Program: B.Tech. (Batch 2018 onward)**

**Semester: 3rd**

**Name of Subject: Data Structures**

**Subject Code: PCIT-101**

**Paper ID:** 16040

**Time Allowed: 03 Hours** **Max. Marks: 60**

**NOTE:**

1) Parts A and B are compulsory.
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice.
3) Any missing data may be assumed appropriately.

**Part – A** **[Marks: 02 each]**

**Q1.**

a) What do you know about Big Oh Notation?

b) Why is circular queue better than linear queue?

c) What is adjacency list?

d) What do you know about skip list?

e) Why balancing is important in Binary Search Tree (BST)?

f) How rehashing is done?

**Part – B** **[Marks: 04 each]**

**Q2.** Explain how insertion and deletion is implemented in doubly linked list.

**Q3.** Write a brief note on B-trees.

**Q4.** How recursion is used in Tower of Hanoi problem?

**Q5.** What is need of hashing? Discuss the various hash functions.

**Q6.** Discuss Garbage Collection and Compaction.

**Q7.** Draw a graph and differentiate between Breadth First Search and Depth First Search in it.

**Part – C** **[Marks: 12 each]**

**Q8.** Convert the infix expression A+(B*C-(D/E^F)*G)*H to postfix notation using stack.

OR

Differentiate between the input-restricted and output-restricted deque (double ended queue) and elaborate the applications of deque in detail.

**Q9.** Explain the Merge Sort in detail by sorting the following list and discuss its complexity:-

{14, 33, 27, 10, 35, 19, 42, 44}

OR

Perform the comparative study of the time complexity of a skewed Binary Search Tree (BST) and AVL trees.

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