Please check that this question paper contains 9 questions and 2 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: 4th
Name of Subject: Data Structures
Subject Code: PCCS-106
Paper ID: 16216
Scientific calculator is Not Allowed

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) List down the limitations of array data structure.

b) Outline the procedure to create a heap.

c) Describe Big 'O' notation used in algorithms.

d) Interpret the terms FIFO and LIFO.

e) Differentiate between Binary Search Tree and AVL Tree.

f) Write an algorithm to insert a node in a circular queue.

Part – B
[Marks: 04 each]

Q2. Convert the following infix expression to postfix. Illustrate each step clearly.

$$A *(B*C+D*E) + F$$

Q3. Compare some of the operations that can be performed on data structures by taking suitable example?

Q4. Demonstrate the concept of hash table? Explain collision resolution in hash table with the help of suitable example.

Q5. Write an algorithm for Binary Search. How it is better from Linear Search?

Q6. Explain Inorder, Preorder and Postorder Traversal operation on Binary tree with example.

Q7. Discuss Link list? Write an algorithm to insert new node at the beginning of a singly linked list.

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Part – C [**Marks: 12 each**]

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Q8. Demonstrate the concept of array. How a multidimensional array is represented in memory? Explain the program which reads two matrices.

<div align="center">OR</div>

a) Define priority queues? Write an algorithm to illustrate insertion and deletion in circular queue.

b) A queue can be implemented using single linked list in two ways. One implementation has front at head and rear at tail of linked list. Other implementation has front at tail and rear at head of linked list. Which implementation among two is efficient and why?

Q9. Explain bubble sort technique with algorithm. Use bubble sort algorithm to sort the following list of numbers:

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14, 33, 27, 35, 10

OR

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Graph data structure can be very efficient in finding shortest path between two cities. Elaborate with an example.

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