

# C. U. SHAH UNIVERSITY

## Summer Examination-2020

Subject Name : Data and File Structure

Subject Code : 4TE03DFS1

Branch: B.Tech (CE)

Semester : 3

Date : 05/03/2020

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

**Q-1 Attempt the following questions: (14)**

- a) What is data structure?
- b) How queue differs from a stack?
- c) Give definition of an almost complete binary tree.
- d) Convert the following string into prefix: A-B/(C\*D^E).
- e) What is linked list?
- f) What do you mean by height balanced binary tree?
- g) Give difference between single queue and circular queue.
- h) The number of leaf nodes in a complete binary tree of depth d is  
i)  $2^d$                       ii)  $[2^{(d-1)}]+1$                       iii)  $[2^{(d+1)}]+1$                       iv)  $(2^d)+1$
- i) What is the worst case performance of Selection sort algorithm?  
i)  $O(\log n)$                       ii)  $O(n * n)$                       iii)  $O(n)$                       iv)  $O(n \log n)$
- j) The depth of a complete binary tree is given by  
i)  $D_n = n \log_2 n$                       ii)  $D_n = n \log_2 n + 1$   
iii).  $D_n = \log_2 n$                       iv)  $D_n = \log_2 n + 1$
- k) Obtain expression tree from following postfix representation:  
ab+cde+\*\*
- l) Differentiate BFS and DFS.
- m) Give difference between Linear Data Structure and Non-Linear Data Structure.
- n) Give example of primitive and non-primitive data structures.

**Attempt any four questions from Q-2 to Q-8**

**Q-2 Attempt all questions (14)**

- (a) Write down algorithms for PUSH, POP, PEEP and CHANGE operations on a stack.
- (b) Explain merge sort with an example. Also write down an algorithm for merge sort.

**Q-3 Attempt all questions (14)**

- (a) Write user defined functions in C to insert and to delete an element from a



circular queue.

- (b) Convert  $A + (B * C - (D / E ^ F) * G)$  infix expression into postfix format showing stack status after every step in tabular form.

**Q-4 Attempt all questions (14)**

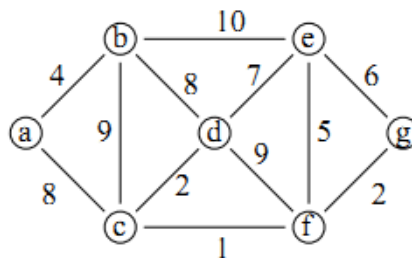
- (a) Write a Program for performing create, insert, delete and display operations in a doubly linked list.
- (b) Explain shell sort with an example. Also write down an algorithm for shell sort.

**Q-5 Attempt all questions (05)**

- (a) The in-order and pre0order traversal of a binary tree are  
d b e a f c g  
a b d e c f g  
respectively. Construct binary tree and find its post-order traversal. (05)
- (b) Write down an algorithm for insertion and deletion in binary tree. (05)
- (c) Explain bubble sort with an example. (04)

**Q-6 Attempt all questions (14)**

- (a) What is hash clash? Explain Primary Clustering, secondary clustering, rehashing and double hashing.
- (b) Define spanning tree. Find minimum spanning tree using Prim's and Kruskal's algorithm for given graph:



**Q-7 Attempt all questions (14)**

- (a) What are the advantages of Multiway search tree in disc access? Construct B-tree of order 5 for the following data:  
1,7,6,2,11,5,10,13,12,20,16,24,3,4,18,19,14,25
- (b) What do you mean by convex hull? Write a short note on Graham's scan algorithm.

**Q-8 Attempt all questions (14)**

- (a) Explain sequential file structure and index sequential file structure in detail.
- (b) Write a short note on threaded binary tree.

