Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**

15BE2106

2nd Semester Back Examination 2017-18

DATA STRUCTURE USING C

BRANCH : AEIE, AERO, AUTO, BIOMED, BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC, FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA, METTAMIN, MINERAL, MINING, MME, PE, PLASTIC, TEXTILE

Time : 3 Hours

Max Marks : 100

Q.CODE : C703

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Part – A (Answer all the questions)

Q1 **Answer the following questions :** ***multiple type or dash fill up type :*** **(2 x 10)**

a) In a stack, if a user tries to remove an element from empty stack it is called _____
(a) Underflow (b) Empty collection
(c) Overflow (d) Garbage Collection

b) Which of the following applications may use a stack?
(a) A parentheses balancing program
(b) Tracking of local variables at run time
(c) Compiler Syntax Analyzer
(d) All of the mentioned

c) The postfix form of the expression (A+ B)*(C*D- E)*F / G is?
(a) AB+ CD*E – FG /** (b) AB + CD* E – F **G /
(c) AB + CD* E – *F *G / (d) AB + CDE * – * F *G /

d) What would be the asymptotic time complexity to add an element in the linked list?
(a) O(1) b) O(n) c) $O(n^2)$ d) None of the mentioned

e) What are the worst case and average case complexities of a binary search tree?
(a) O(n), O(n) (b) O(logn), O(logn)
(c) O(logn), O(n) (d) O(n), O(logn)

f) If several elements are competing for the same bucket in the hash table, what is it called?
(a) Diffusion (b) Replication
(c) Collision (d) None of the mentioned

g) For any two different vertices u and v of an Acyclic Directed Graph if v is reachable from u, u is also reachable from v?
(a) True (b) False

h) What is the worst case complexity of bubble sort?
(a) O(nlogn) (b) O(logn) (c) O(n) (d) $O(n^2)$

i) Which data structure is used for implementing recursion?\
(a) Queue (b) Stack (c) Array (d) List

j) The Data structure used in standard implementation of Breadth First Search is?
(a) Stack (b) Queue
(c) Linked List (d) None of the mentioned

Q2 **Answer the following questions : *Short answer type :*** **(2 x 10)**

a) What are the major data structures used in the following areas : RDBMS, Network data model and Hierarchical data model.

b) What is the data structures used to perform recursion?

c) What are the notations used in Evaluation of Arithmetic Expressions using prefix and postfix forms?

d) List out few of the Application of tree data-structure?

e) In an AVL tree, at what condition the balancing is to be done?

f) List out few of the applications that make use of Multilinked Structures?

g) Classify the Hashing Functions based on the various methods by which the key value is found.

h) What are the types of Collision Resolution Techniques and the methods used in each of the type?

i) What is a spanning Tree?

j) Does the minimum spanning tree of a graph give the shortest distance between any 2 specified nodes?

Part – B (Answer any four questions)

Q3 **a)** Write a C program to merge two sorted linked list. **(10)**

b) Write a function to delete a node from a circular linked list. **(5)**

Q4 **a)** Evaluate the given prefix expression appended with a left parenthesis at the beginning E: (, -, *, 3, +, 16, 2, /, 12, 6 **(10)**

b) Convert the following infix expression to postfix notation E: (A+(B*C-(D-E^F)*G)*H) **(5)**

Q5 **a)** Write a C program to create a single linked list and split it at the middle and make the second half as the first. Display the final list. **(10)**

b) Write an algorithm to insert a node into the double linked list. **(5)**

Q6 **a)** Insert the following nodes in an AVL tree. Nodes are 55, 66, 77, 15, 11, 33, 22, 35, 25, 44, 88, 99 **(10)**

b) Construct a binary tree from the given order **(5)**
Post Order : DFEBGLJKHCA In Order: DBFEAGCLJHK

Q7 **a)** Draw a binary search tree whose elements are inserted in the following order 50, 70, 90, 93, 100, 20, 10, 12, 9, 25, 51, 15, 95 **(10)**

b) Explain the difference between depth-first and breadth-first traversing techniques at a graph. **(5)**

Q8 **a)** Write a program to arrange the list of numbers in ascending order using quick sort. **(10)**

b) What is the time complexity of the quick sort algorithm to sort a list of n equal elements? **(5)**

Q9 **a)** Write an algorithm for heap sort. **(10)**

b) Sort the following lists in ascending order using insertion sort. S, T, R, U, C, T, U, R, E, S, D, A, T, A. **(5)**