QPC: RS20BTECH219 AR 19 Reg. No

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Second Semester – Regular) Examinations, September – 2021

BESBS2040 – DATA STRUCTURES AND ALGORITHMS

(Common to All Branches)

Time: 2 hrs Maximum: 50 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 = 10 Marks)**

Q.1. Answer ***ALL*** questions		[CO#]	[PO#]
a.	What does it mean if TOP = =NULL? i) The stack is FULL ii) The stack contains only one element iii) The stack is Empty iv) The stack does not exist	CO1	PO1
b.	Which of the following formula is used to calculate Rear value during insertion in a circular queue? i) Rear=Rear-1 ii) Rear=(Front+1) %Size of Queue iii) Rear=(Rear-1) %Size of Queue iv) Rear=(Rear+1) %Size of Queue	CO1	PO1
c.	Here is an infix expression: 4 + 3*(6*3-12). Suppose, we are using the usual stack algorithm to convert the expression from infix to postfix notation. The maximum number of symbols that will appear on the stack at one time during the conversion of this expression is/are? (i) 1 (ii) 2 (iii) 3 (iv) 5	CO1	PO2
d.	In a double linked list, if we need to delete a node pointed by X then which of the following is suitable? (i) Y=Prev[X], Z=Next[X], Y=Z (ii) Y=X, X=Prev[X], Z=Y, X=Next[X] (iii)Next[Prev[X]]=Next[X],Prev[Next[X]]=Prev[X] (iv) delete X	CO2	PO2
e.	In which of the following methods, each element is compared with adjacent element? (i) Insertion sort (ii) quick sort (iii) bubble sort (iv) selection sort	CO2	PO2
f.	What is a complete binary tree? (i) Each node has exactly zero or two children. (ii) A binary tree, which is completely filled from right to left except last level. (iii) A binary tree, which is completely filled from left to right except last level (iv) A tree in which all nodes have degree 2	CO3	PO1
g.	In hashing, if two key values generate same hash address then it is called. (i) linear probing (ii) random probing (iii) chaining (iv) collision	CO4	PO1
h.	An edge which started from a vertex and connects back to same vertex then it is called? (i) cycle (ii) self loop (iii) connected (iv) adjacent	CO4	PO1
i.	Which of the following is TRUE about binary tree?	CO3	PO1

(i) It is a cyclic graph (ii) It is an acyclic graph
(iii) It is a simple graph (iv) it is a complete graph

j. In which hashing method each Hash Key is divided using a prime number to generate Hash Address? CO4 PO1

(i) mid square method (ii) chaining
(iii) division method (iv) folding method

PART – B: (Short Answer Questions) **(2 x 5 = 10 Marks)**

Q.2. Answer ***ALL*** questions [CO#] [PO#]

a. State the difference between row-major order and column major order of matrix memory representation. CO1 PO3

b. A sequence of elements given below. Construct a Binary Search Tree. CO3 PO
90, 75, 49, 65, 95, 70, 20, 10, 40, 60

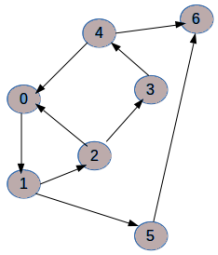
c. Construct an expression tree for the given arithmetic expression: (A+B-(C/D^E)*F) CO3 PO2

d. Elaborate the following sequence of operations are performed on an empty stack of 5 memory locations: CO1 PO3

PUSH (1), PUSH (0), PUSH (0), PUSH (1) , POP, POP, PUSH(1), PUSH(0), POP

Find the sequence of popped out items

e. Define In-degree, out-degree, cycles and find them following in the below graph: CO4 PO2



PART – C: (Long Answer Questions) **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions Marks [CO#] [PO#]

3. Write down algorithm for postfix evaluation using stack. Hence find the postfix expression: 5 , 6, * , 24 , 2 , 3, ^ , / , - using stack. (6) CO1 PO3

4. Write down the algorithm for conversion of infix into postfix using stack. Given infix expression: (A + B - (C * D / E)). Find its equivalent postfix notation using stack. (6) CO1 PO2

5. What is Binary Tree? How to represent it in memory using array and linked list? Explain the difference between them with suitable example. (6) CO3 PO3

6. What is a graph? Explain the memory representation of a graph using incidence matrix, adjacency matrix and linked representation with a suitable example. (6) CO4 PO3

7. Write down the non-recursive algorithm for pre-order traversal on a binary tree. (6) CO3 PO3

8. Write down the algorithms for insertion at end in a single linked list. (6) CO2 PO3

9. What is Balance Factor? Write down the rotations of an AVL Tree and also explain the construction of an AVL Tree during insertion of nodes (6) CO3 PO3

10. What is Hashing? Explain Folding and Mid square methods using suitable example. (6) CO4 PO3

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