TDC (CBCS) Odd Semester Exam., 2020 held in March, 2021

COMPUTER APPLICATION

(3rd Semester)

Course No. : BCACC-301T

(Data Structures)

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

1. Answer the following as directed (any *ten*) : 2×10=20

(a) Write down the applications of stack.

(b) What do you mean by data structure?

(c) Mention one limitation of array.

(d) Write the postfix notation of $(A + B) - C$.

(e) State the difference between array and linked list.

(f) Define De-queue.

(g) A queue follows ____ (LIFO/FIFO) scheme.

(Fill in the blank)

(h) When does a normal queue, if implemented using an array of size 'MAX', get full?

(i) Rear = MAX – 1

(ii) Front = (Rear + 1)% MAX

(iii) Front = Rear + 1

(iv) Rear = Front

(Choose the correct answer)

(i) Write down the benefit of using recursion in a program.

(j) Define height balanced tree.

(k) Write down the properties of binary search tree.

(l) In a full binary tree if there are L leaves, then total number of nodes N are

(i) $N = 2 * L$

(ii) $N = L + 1$

(iii) $N = L - 1$

(iv) $N = 2 * L - 1$

(Choose the correct answer)

(m) What is the worst case of linear search?

(n) What are the limitations of binary search?

(o) Why sorting is needed?

(p) Which sorting technique uses the concept of divide and conquer?

(q) What is hashing?

(r) What is a hash function?

(s) When does collision occur in hashing?

(t) What do you mean by open addressing?

SECTION—B

Answer any *five* of the following questions : 6×5=30

2. Write down the algorithm to convert infix to postfix expression.

3. Write down the algorithm to delete an element from the linked list.

4. How do you declare a single dimensional array? Write an algorithm to traverse a linear array.

5. Discuss the array representation of queue data structure.

6. Using the following traversal, construct the corresponding binary tree :

Inorder : H K D B I L E A F C M J G

Preorder : A B D H K E I L C F G J M

7. What is thread? How is it useful? What are the advantages of threading in binary tree?

8. Using the BUBBLE sort algorithm, find the number of comparisons and the number of interchanges for sorting the letters in 'PEOPLE' in alphabetic order.

9. Sort the given array of the element using heap sort algorithm :

$A[16, 14, 10, 8, 7, 9, 3, 2, 4, 1]$

10. What do you mean by closed hash table and open hash table?

11. Consider the given list of keys :

35, 24, 10, 31, 19, 28

Let hash function be $h(x) = K \bmod 7$, show the contents of the hash table in closed hash table form.

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