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B.Sc. RNLKWC-/C5T/22

2022

BCA (Hons)

B.Sc. Third Semester End Examination - 2022

PAPER - C5T

Data Structure

*Full Marks : 40*

*Time : 2 hours*

*The figures in the right-hand margin indicate marks.  
Candidates are required to give their answers in their own  
words as far as practicable.  
Illustrate the answers wherever necessary.*

**Group-A**

1. Answer any five questions : 5×2=10
- a) What do you mean by deque?
- b) Show the graphical solution of Tower of Hanoi problem with three disks.

*(Turn Over)*

( 2 )

- c) What do you understand by depth of a node in a binary tree?
- d) Find the postfix representation of the arithmetic expression  $b+(g+d)\times a$ .
- e) Give in-order sequence : DJGBHEAFKIC and post-order sequence : JGDHEBKIFCA. Construct BT for the same.
- f) What is graph? Give matrix and adjacency list representaton of graph constructed by yourself.
- g) What is an Algorithm? Explain the criteria that an algorithm must satisfy.
- h) What is an array and how the array pointers are declared.

**Group - B**

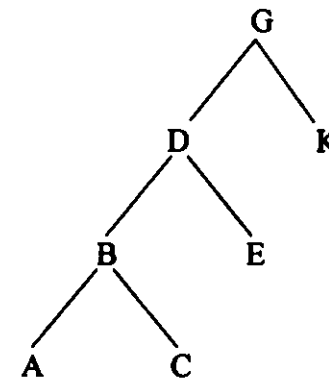
Attempt any four questions.

4×5=20

- 2. Consider an empty circular queue which can hold maximum ten elements. Show the content of queue and values of front and rear pointer after each of the following operations :

( 3 )

- a. insert(13),
  - b. insert (9),
  - c. delete ( ),
  - d. delete ( ),
  - e. delete ( ), and
  - f. insert(11) 1+4
- 3. Consider a binary search tree whose pre-order and in-order traversal sequence are 16, 18, 20, 25 and 20, 16, 18, 25 respectively. Show the content of binary search tree after inserting the following nodes into it one by one : 26,10,8,19.
  - 4. What is hieght-balance tree? Convert the following binary tree into AVL tree: 2+3



( 4 )

5. Construct BST for the element step-by-step :  
100, 85, 45, 55, 110, 20, 70, 65, 113, 145, 132 and 96.
6. What is pointer to pointer? Give the following declaration.  
int a=8; int b=9; int \*p=&a; int \*q=&b;  
What is the value of each of the following expression?  
++a, ++(\*p), -( \*q), -b
7. List the disadvantages of linear queue and explain how it is solved in circular queue. Give the algorithm to implement a circular queue with suitable example.

**Group - C**

**Attempt any one question**

**1×10=10**

8. a) Write an algorithm that evaluates an arithmetic expression which is represented in postfix expression.  
5
- b) Write an algorithm that can detect when stack encounters underflow or overflow.  
5
9. How an insertion sort works? Suppose an array A contains 8 elements as follows :  
77, 33, 44, 11, 88, 22, 66, 55. Trace insertion sort algorithm for sorting in ascending order.