

U.G. 2nd Semester Examination - 2021**BCA****[HONOURS]****Course Code : BBCACCHC202****Course Title: Data Structure using C**

Full Marks : 30

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.*

1. Answer any **ten** questions: 1×10=10
- What is Clique in respect to undirected graph?
 - What are dynamic data structure?
 - Differentiate between NULL and void.
 - What is recursive algorithm?
 - What is unilaterally connected graph?
 - How many spanning trees can a graph has?
 - Why malloc() returns void pointer?
 - What are the advantages of binary search over a linear search?

- Draw the expression tree from the following postfix expression-
3, 4, 15, 6, +, ^, +, 14, 3, %, 65, 5, +, +, -
- What is strictly binary tree?
- What are the applications of Tree data structure?
- Define doubly linked list.
- Write down the node structure in C for doubly linked list.
- Give example of primitive and non primitive data structure.
- What is static linked list? State any two applications of it.

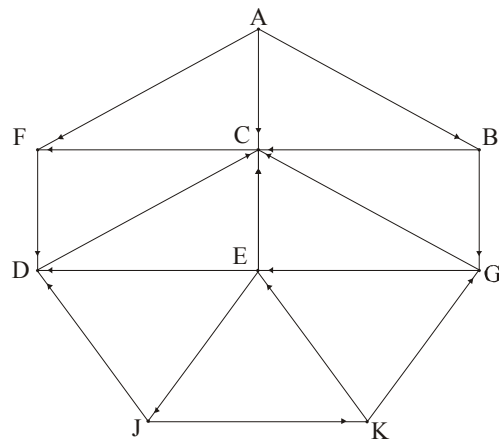
2. Answer any **five** questions: 2×5=10
- Draw the binary tree, whose inorder and preorder traversal gives the following sequences of node:
Inorder : E A C K F H D B G
Preorder : F A E K C D H G B
 - Given the following adjacency matrix draw the weighted graph-

$$\begin{bmatrix} 0 & 4 & 0 & 2 & 0 \\ 0 & 0 & 0 & 7 & 0 \\ 0 & 5 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 3 \\ 0 & 0 & 1 & 0 & 0 \end{bmatrix}$$

- c) Apply selection sort on the following array-
16, 15, 2, 13, 6.
- d) Given the list of numbers-
arr[] = {1,3,5,7,9,11,13,15,17,19,21}
Search for value 19 using interpolation search
technique.
- e) What are the advantages of linked list over
array?
- f) Convert the following infix notation to prefix
notation using stack-
 $A - (B / C + (D \% E * F) / G) * H$
- g) What is the main purpose of data structure?
- h) Show the array list for each pass to sort the
following integer array using selection sort-
arr[] = {20,35,40,100,3,10,15}

3. Answer any **two** questions: $5 \times 2 = 10$

- a) For the following graph-



- i) Find out the adjacency list.
- ii) Find out the minimum path P form A to J
(assume each edge has length 1).

$$2\frac{1}{2} + 2\frac{1}{2} = 5$$

- b) i) Write down the function code for bubble
sort.
- ii) Define degree of a node within a tree.

$$4 + 1 = 5$$

- c) Write down the C functions to

- i) To insert a node at the beginning of the
single linked list.
- ii) To insert a node at the end of the single
linked list.

$$2\frac{1}{2} + 2\frac{1}{2} = 5$$