BCA–3002

B. C. A. (Third Semester)
EXAMINATION, 2022-23
(New Course)

Paper Second

DATA STRUCTURES USING C & C++

Time : Two Hours]　　　　　[Maximum Marks : 75

Note : This paper consists of three Sections A, B and C. Carefully read the instructions of each Section in solving the question paper. Candidates have to write their answers in the given answer-copy only. No separate answer-copy (**B Copy**) will be provided.

Section—A
(Short Answer Type Questions)

Note : All questions are compulsory. Answer the following questions as short answer type questions. Each question carries 5 marks.

1. (A) Explain circularly linked lists.

　(B) List down the applications of List.

(C) What is the difference between storing data on the heap vs. on the stack ?

(D) What is a heap ?

(E) Draw a binary tree for the following expression :

　　$A * B - (C + (D) * (P/Q))$

(F) Give the pre and postfix form of the expression $(a + ((b*(c - e))/f)$ where root node is '+'.

(G) Consider the following stack of characters, where STACK is allocated N = 8 memory cells STACK : A,C,D,F,K,_,_,_. (— means empty allocated cell). Describe the stack as the following operations takes place :

(I) POP(STACK, ITEM)

(II) POP(STACK, ITEM)

(III) POP(STACK, ITEM)

(IV) PUSH(STACK, R)

(V) PUSH(STACK, L)

(VI) PUSH(STACK, S)

(VII) PUSH(STACK, P)

(VIII) POP(STACK, ITEM)

(H) What are the merits and demerits of array implementation of lists ?

(I) Explain the usage of stack in recursive algorithm implementation.

Section—B

(Long Answer Type Questions)

Note : This section contains four questions from which *one* question is to be answered as long question. Each question carries 15 marks.

2. (a) How are polynomial manipulations performed with lists ? Explain the operations

(b) Explain the various operations of the list ADT with examples.

Or

3. (a) Explain the operation of traversing a linked list. Write the algorithm and give an example.

(b) Explain the array implementation of queue ADT in detail.

Or

4. What are the applications of linked lists in dynamic storage management ?

Or

5. (a) Explain circular queue ? Write an algorithm to insert and delete an element from a circular queue.

(b) Explain how infix expressions are converted to polish notation. Illustrate your answer with a suitable example.

Section—C

(Long Answer Type Questions)

Note : This section contains four questions from which *one* question is to be answered as long question. Each question carries 15 marks. https://www.csjmuonline.com

6. (a) Define Tree. Explain the tree traversals with algorithms and examples.

(b) Explain Heap tree ADT in detail.

Or

7. (a) Define topological sort. Explain with an example.

(b) Describe the algorithms used to perform single and double rotation on AVL tree.

Or

8. How to insert and delete an element into a binary search tree ? Write down the code for the insertion routine with an example.

Or

9. (a) Explain the various representations of graphs with examples in detail.

(b) Write an algorithm for binary search with a suitable example.