

Roll No.

BCA-302(N)

B. C. A. (Third Semester)
EXAMINATION, Dec., 2019
(New Course)

Paper Second

DATA STRUCTURE USING C AND C++

Time Three Hours] [Maximum Marks 75

Note : Attempt questions from all Sections as directed.

Inst. : The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

Section—A

(Short Answer Type Questions)

Note : Attempt all questions from this Section. Each question carries 3 marks.

1. (A) Explain in brief about sparse matrix.
- (B) What do you understand by Stack overflow and underflow ?
- (C) Evaluate the following postfix expression :

$$AB \cdot C * D /$$

if A = 2, B = 3, C = 4 and D = 5.

(C-62) P. T. O.

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- (D) If the inorder traversal of binary tree is B, I, D, A, C, G, E, H, F and its postorder traversal is I, D, B, G, C, H, F, E, A. Determine binary tree.
- (E) Why stack is called a LIFO data structure ?
- (F) Define the terms front and rear in a queue.
- (G) How does the merge sort work ? Explain.
- (H) Define the term hashing.
- (I) Differentiate between a max-heap and a min-heap.

Section—B

(Long Answer Type Questions)

Note : Attempt any two questions. Each question carries 12 marks. http://www.csjmuonline.com

2. What is Stack ? Write an algorithm to convert infix expression to postfix expression using stack.
3. What is circular queue ? Write the implementation of circular queue using array and also write method to perform insertion and deletion on it.
4. What do you mean by traversing a linked list ? Write an algorithm to traverse a singly linked list.
5. Write a program to sort the following elements :
77, 49, 25, 12, 9, 33, 56, 81
using bubble sort.

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Section—C

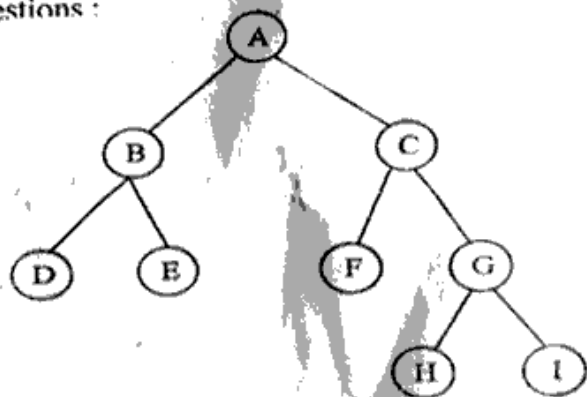
(Long Answer Type Questions)

Note : Attempt any two questions. Each question carries 12 marks.

6. Create a B-tree of order 5 by inserting the following elements :

3, 14, 7, 1, 8, 5, 11, 17, 13, 16, 23, 12, 20, 26, 4, 6, 18, 24, 25 and 19.

7. Consider the tree given below and do the following questions :



- (a) Name the leaf node. |
- (b) Name the non-leaf node. |
- (c) Name the ancestors of E. |
- (d) Name the siblings of C. |
- (e) Find the height of tree. |
- (f) Find the height of sub-tree rooted at E. |
- (g) Find the level of node E. |
- (h) Find the degree of Node A. |
- (i) Find the inorder, preorder and post-order traversal. |

8. Define Binary search. Write a program to search an element in an array using binary search.

9. Explain the concept of binary search tree. Create a binary search tree using following data elements:

45, 23, 29, 85, 92, 7, 11, 35, 49 and 51