DR. SHYAMA PRASAD MUKHERJEE UNIVERSITY

(Following Upgradation of Ranchi College, Ranchi, under RUSA Programme, Component-I)

Ranchi, Jharkhand.

Roll Number: | | | | | | | | | | |

M.C.A. Sem I [Course Name]

MM : 70 | **CCMCA103 – Data Structure Through C++** | Time : 3 Hrs.

Notes:

1. Attempt **ALL** Sections. Marks are written against each Section.
2. Attempt **ALL** parts from **SECTION A** (Total 20 Marks). Each part is of 2 Marks.
3. Attempt any **FOUR** parts from **SECTION B** (Total 20 Marks). Each part is of 4 Marks.
4. Attempt any **TWO** parts from **SECTION C** (Total of 30 Marks). Each part is of 15 Marks.
5. Missing data if any may be suitably assumed and mentioned.

SECTION-A [20 Marks]

Attempt **ALL** parts. All parts carry **TWO** marks. **[2*10 = 20]**

1. All of these Which data structure allows deleting data elements from front and inserting at rear?
   (a) Stacks (b) Queues
   (c) Deques (d) Binary Search Tree
2. Which of the following sorting algorithm is divide and conquer type?
   (a) Bubble sort (b) Insertion sort
   (c) Quick sort (d) None of these
3. A sorting algorithm which can prove to be best time algorithm in one case and worst time algorithm at other time
   (a) Selection sort (b) Heap sort
   (c) Quick sort (d) All of these
4. Which of the following data structure is non-linear type?
   (a) Strings (b) Lists
   (c) Stacks (d) None of these
5. Adding data to stack is called
   (a) PUSH (b) POP
   (c) Both (a) and (b) (d) None of these
6. A binary tree whose node has either zero or two children is called
   (a) Complete binary tree (b) Binary search tree
   (c) Extended binary tree (d) None of these
7. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal
   (a) ABFCDE (b) ADBFEC
   (c) ABDECF (d) ABDCEF

8. Items can be removed from the both end of
   (a) Queue (b) tree
   (c) Stacks (d) Deque
9. Which of the following is not a logical data structure?
   (a) tree (b) Lists
   (c) Stacks (d) chain
10. FIFO is used in
   (a) Queue (b) Linked List
   (c) Stack (d) tree

SECTION-B [20 Marks]

Attempt any **FOUR** parts. Each part carries **FIVE** marks. **[5*4 = 20]**

11. What is data structure? Differentiate linear from a nonlinear data structure and also explain Time and Space Complexity with an example.
12. How Binary Search Works? Explain with an example and also write the algorithm for the same.
13. Write an algorithm to insert and delete an element from a Circular Queue.
14. What are Binary trees? What are tree traversals?
15. What is a Stack? What are the applications of stack? Write an algorithm of PUSH and POP operation on Stack.
16. Write an algorithm to find the sum of rows, sum of columns and sum of diagonals of a square matrix.

SECTION-C [30 Marks]

Attempt **TWO** parts. Each part carries **FIFTEEN** marks. **[15*2 = 30]**

17. What is a Linked list? What are the applications of linked list? Write an algorithm to insert and delete a node in Singly Linked List.
18. Write a program in C++ to generate Fibonacci Series between 1-100 using recursive function. (e.g. 1, 1, 2, 3, 5, 8, 13, .., .., .., ..)
19. Explain Quick Sort with the help of example and also write an algorithm for the same.
20. Write a program in C++ to input your name and Date_of_birth using structure/class, calculate your age with system_date and display your name and age (year(s), month(s) & day(s)) with appropriate format.

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