

**17U331**

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Name: .....

Reg. No.....

**THIRD SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2018**

(Supplementary/Improvement)

(CUCBCSS-UG)

**CC15U BCA3 B04 - DATA STRUCTURES USING C++**

(Computer Applications - Core Course)

(2015 & 2016 Admissions)

Time: Three Hours

Maximum: 80 Marks

**PART A**

Answer *all* questions. Each question carries 1 mark.

1. Define ADT.
2. Write the worst case time complexity of quick sort.
3. Define array.
4. How can you define the depth of a tree?
5. What is linear probing?
6. What is a queue?
7. What is a linked list?
8. What is a double ended queue?
9. Write down the methods of a graph traversal?
10. What is the best case time complexity of binary search?

**(10 x 1 = 10 Marks)**

**PART B**

Answer *all* questions. Each question carries 2 marks.

11. What is sparse matrix?
12. What is a pointer array?
13. Write short note on double linked list.
14. Differentiate between linear and non-linear data structures?
15. What is algorithm? What are the characteristics of an algorithmic language?

**(5 x 2 = 10 Marks)**

**PART C**

Answer any *five* questions. Each question carries 4 marks.

16. Write a note on two dimensional arrays with example.
17. What are the different representations of graphs?
18. Explain single linked list with an example.

19. Make a note on various queue structures.
20. Define a tree and its basic terminologies.
21. Explain hash functions.
22. Explain dynamic storage management.
23. What do you mean by postfix notation? Convert  $(A+B)*C-(D-E)*(F+G)$ .

(5 x 4 = 20 Marks)

#### **PART D**

Answer any *five* questions. Each question carries 8 marks.

24. Write an algorithm to implement merge sort. Explain it with an example.
25. Write a program to implement a stack using linked list.
26. Explain with example:           (a) De-queue           (b) Priority Queue
27. Give steps for creating a binary search tree for the sequence of elements:  
98, 53, 135, 71, 18, 9, 18, 24, 65, 88, 125, 100, 110, 160, 175, 148  
After creating the tree, find the height of the tree, number of internal nodes, number of leaf nodes, Number of nodes with degree 1, and number of nodes at the last level.
28. What are the two ways of implementing stacks? Which one is preferred over the other and why?
29. The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function  $h(k) = k \bmod 10$  and linear probing. What is the resultant hash table?
30. What are the applications of graph structures? Explain the different graph traversal methods.
31. Explain collision handling techniques in hashing.

(5 x 8 = 40 Marks)

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