

D 93396

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Name.....

Reg. No.....

**FIRST SEMESTER M.Sc. DEGREE REGULAR/SUPPLEMENTARY
EXAMINATION, NOVEMBER 2020**

(CBCSS)

Computer Science

CSS 1C 02—ADVANCED DATA STRUCTURES

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend **all** questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Section A*Answer any **four** questions.**Each question carries 2 weightage.*

1. Write an algorithm to find the largest number in a list of n integers and comment on its time complexity.
2. Explain the working principle of any *one* of the following sort algorithms (Insertion, Bubble, Selection).
3. What is a recursive list ?
4. Define Binary search tree. Draw a sample BST.
5. Explain the need for balancing a search tree.
6. Explain the concept of linear probing.
7. What is a Heap ?

(4 × 2 = 8 weightage)

Section B*Answer any **four** questions.**Each question carries 3 weightage.*

8. Discuss the objectives and desirable characteristics of an algorithm.

Turn over

9. Write algorithms for the following operations on singly linked list :
- (i) To reverse the list.
 - (ii) To concatenate list.
 - (iii) To delete all nodes.
10. With suitable example explain an efficient representation for sparse matrix.
11. Explain the different graph representation schemes.
12. Write a note on Tries.
13. Explain the properties of Min-max heaps. Highlight applications of Min-Max heaps.
14. Compare binary heap with Fibonacci heaps.

(4 × 3 = 12 weightage)

Section C

*Answer any two questions.
Each question carries 5 weightage.*

15. Write necessary functions for the implementation of stack data structure as a linked list. Illustrate with example, the steps in the conversion of an infix expression to postfix, using the data structure Stack.
16. Explain the properties of Red-Black tree. Illustrate with figures, the steps in the insertion of the following numbers, into an empty Red-Black tree.
- 2, 1, 4, 5, 9, 3, 6, 7.
17. Explain implementation of double hashing algorithms. Discuss the need and steps in rehashing and extendable hashing.
18. What is a Binomial heap ? Give examples. Explain the operations performed on Binomial heaps. Highlight any one application of Binomial heap.

(2 × 5 = 10 weightage)