

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – MATHEMATICS

FIFTH SEMESTER – NOVEMBER 2019

16/17UMT5ES01 – DATA STRUCTURES AND ALGORITHMS

Date: 06-11-2019
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

SECTION A

Answer ALL the questions:

(10x2 = 20)

1. Define Pseudocode.
2. Write the steps involved in finding Big- O notation.
3. Write the types of searching.
4. Show that sentinel searching is better than sequential search.
5. What are the four basic linear list operations?
6. Define a stack.
7. Find the number of vertices of a complete binary tree.
8. Define a Binary tree.
9. Write about sort classification.
10. Define Sort stability.

SECTION B

Answer any FIVE questions:

(5x8 = 40)

11. Explain algorithm header.
12. Calculate Big-*O* notation for the following:
 - (a) $f(n) = \frac{n(n+1)}{2}$
 - (b) $f(n) = a_j n^k + a_{j-1} n^{k-1} + \dots + a_2 n^2 + a_1 n + a_0$
13. Apply Sentinel search to find the target 85 in the given list 86, 73, 9, 85, 37, 85.
14. Write Pseudocode for the ordered list algorithm.
15. Explain the four queen's problem using stack.
16. Write the Pseudocode to convert decimal to binary.
17. Brief the Tree nomenclature.
18. Apply heap sort process to sort the list 4,10,21,14,8,7,91,81.

SECTION C

Answer any TWO questions:

(2x20 = 40)

19. (a) Brief Algorithm efficiency.

(b) Differentiate Composite and Atomic data.

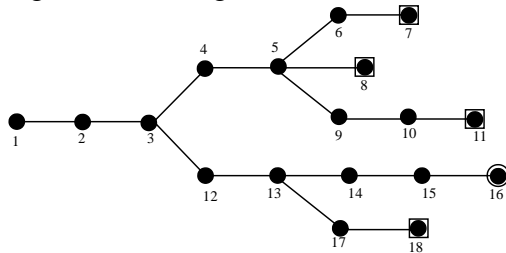
(12+8)

20. (a) Explain the Binary search. Write a Pseudocode for Binary Search.

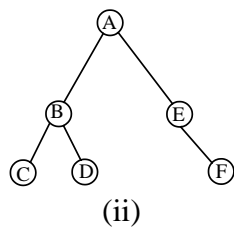
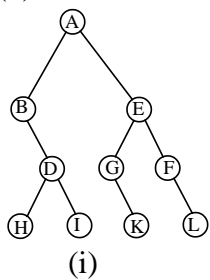
(b) Find the target 23 in the list given by using Binary search 4, 7, 8, 10, 14, 21, 22, 36, 62, 77, 81, 91.

(12+8)

21. (a) Apply Backtracking to find the goal 16 in the given tree.



(b) Write the inorder, post order for the following trees:



(10+10)

22. (a) Write Bubble sort algorithm.

(b) Sort the given list using Bubble sorting 23, 78, 45, 8, 56, 31.

(12+8)
