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| **ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27** |
| **B.C.A – II SEMESTER** |
| **SEMESTER EXAMINATION: APRIL 2018** |
| **CA2118- Data Structure** |
|  |  |  |  |  |  |
| **Time- 2 1/2 hrs** |  | **Max Marks-70** |
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| **This paper contains two printed pages and three parts** |
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SECTION A

Answer **ALL** questions. Each question carries **TWO** marks 2\*10=20

1. Explain linear data structures with an example.

2. Define time and space complexity of an algorithm.

3. What are asymptotic notations? List the different types of Asymptotic Notations.

4. Write the difference between static memory allocation and dynamic memory allocation.

5. What are the benefits of circular queues over linear queue?

6. Convert the following infix expression to postfix expression
 (a-(b + c)\*d) + (e + f)

7. Define linked list? Write the different operations performed on a linked list.

8. What is the difference between full binary tree and complete binary tree?

9. Construct a binary search tree for the following data
 45,85,96,78,34,12,49,38,18,45

10. What are blocking factor? How do you calculate the blocking factor for a node?

SECTION B

 Answer any **FIVE** questions. 6\*5=30

11. What is data structure? Discuss different types of data structures with their characteristics features.

12. Write an algorithm for inserting and deleting an element from a queue.

13. a. Describe Inorder, Preorder and Postorder traversals.

 b. Draw the Binary tree when the following traversals are given below

 INORDER: 2 3 5 4 6 1 8 7 9

 PREORDER: 1 2 3 4 5 6 7 8 9 [2+4]

14. a. What is a stack?

 b. Write an algorithm to perform the PUSH operation of a stack.

 c. Explain any two applications of stack. [2+2+2]

15. Write an algorithm to evaluate a postfix expression.

 16. Differentiate between linear and binary search techniques. Explain with examples. Write an algorithm to perform linear search on a list of N numbers.

17. Write an algorithm to perform insertion sort. Explain the steps clearly with an example.

SECTION C

 Answer any **TWO** questions. 10\*2=20

18. What is quick sort technique? Give an algorithm and sort the following numbers using quick sort.

10, 1, 9, 8, 27, 90, 95, 55, 56, 43

19. a. What is the use of a Link List?

 b. Write an algorithm to add a node at a particular position of the Link List. [3+7]

20. a. What is a Circular queue?

 b. Explain the memory representation of a circular queue.

 c. Write an algorithm to add elements to a circular queue. [2+3+5]