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Total No. of Questions : 09]

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## Paper ID [A0454]

(Please fill this Paper ID in OMR Sheet)

**B. Tech. (Sem. - 3<sup>rd</sup>)**

### DATA STRUCTURES AND PROGRAMMING METHODOLOGY (CS - 207)

Time : 03 Hours

Maximum Marks : 60

**Instruction to Candidates:**

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

#### Section - A

Q1)

(10 × 2 = 20)

- a) What do you mean by nonlinear data structure? Give examples.
- b) Define complexity of an algorithm.
- c) List out few of the applications of the sets.
- d) Give some advantages and disadvantages of using linked storage for storing the strings.
- e) There are 8, 15, 13, 14 nodes were there in 4 different trees. Which of them could have formed a full binary tree.
- f) Write the postfix notation for the following expression:  
$$(A + B)*C - (D - E)^F$$
- g) How queues are represented in memory.
- h) What is adjacency matrix representation of a graph in memory?
- i) What is hashing function?
- j) What is the union of the sets  $A = \{1, 1, 2, 7\}$  and  $B = \{0, 1, 3, 4\}$ .

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**Section - B**

(4 × 5 = 20)

- Q2) Write an algorithm for linear search. Also write its complexity.
- Q3) Write an algorithm for insertion of an item at the beginning of the linked list.
- Q4) Write a recursive procedure for generating a Fibonacci series.
- Q5) Sort the following list of numbers  
52, 1, 27, 85, 66, 23, 13, 57  
Using any efficient sorting algorithm.
- Q6) What are the different file organizations? Write a program in your known computer language to write into the file.

**Section - C**

(2 × 10 = 20)

- Q7) Explain any two most commonly used hash functions with at least one example each. Write their advantages as well as their applications.
- Q8) Explain the Warshall's algorithm for finding the path in graph.
- Q9) What are the different ways for traversing a binary tree. Draw a binary tree for the following algebraic expression:  
 $[a + (b - c)] * [(d - e)/(f + g - h)]$   
Explain preorder and post order traversals of the binary tree (by using example of constructed binary tree for the above expression).

