Roll No: .....

Total No. of Questions : 09] [Total No. of Pages :02

Paper ID [A0454]

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B. Tech. (Sem. - 3rd)

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}.

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).