Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	**:CSE**	**Semester**	**:III**
Title of the Course	**:Data Structure**	**Course Code**	**:CS202**

Time: 2 Hours **Maximum Marks: 30**

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1. Design a method for keeping two stacks within a single linear array so that neither stack overflows until all of memory is used and an entire stack is never shifted to different location within the array. Write algorithm PUSH1 & PUSH2, POP1 and POP2 to manipulate the two stacks. [4]

2. Rewrite the solution to the towers of Hanoi problem so that it uses only one recursive call instead of two. [4]
3. What is the complexity and algorithm of Bubble sort algorithm, Find the number C of comparisons and the number D of interchanges which alphabetize the n=6 letters in PEOPLE. [4]
4. Solve the following expression Q using stacks: [4]
   Q: ((A + B) * D) ^ (E – F)
5. Write a method to create a link list and also write a method which will insert a node(Y) inside a link list before a particular node (let node data X). [4]
6. Write a method to delete a node in a link list. [4]
7. Consider the linear arrarys AAA(5:50), BBB(-5, 10) and CCC(18). [3]
   a) Find the number of elements in each array.
   b) Suppose Base(AAA) = 300 and w = 4 words per memory cell for AAA. Find the address of AAA[15], AAA[35], AAA[55]
8. Write a program for find out the duplicate elements in array and print the indeed of those elements. [3]