

B.Sc. (Part-II) (With Credits)-Regular-Semester 2012 Sem IV  
**B.Sc.24141-Computer Science-I (Data Structures) Paper-I**

P. Pages : 2

Time : Three Hours



**GUG/W/16/5600**

Max. Marks : 50

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- Notes : 1. All questions are compulsory and carry equal marks.  
2. Draw neat and labelled diagram wherever necessary.

**Either:**

1. a) Explain the Insertion sort method with example. 5  
b) Write an algorithm to calculate the sum of all even values in an array of size n. 5

**OR**

- c) Discuss the limitations of Binary search method. Explain the binary search method with suitable example. 5  
d) Define a traversal operation of an array write an algorithm for the traversal of an array of size n. 5

**Either:**

2. a) Translate the arithmetic Postfix expression p, into its equivalent infix expression.  
p : 12, 7, 3, -, 1, 2, 1, 5, +, \*, +. 5  
b) Write an algorithm to delete the element from the Queue Q. 5

**OR**

- c) Write an algorithm to insert an element into the stack. 5  
d) Explain the circular queue with suitable example. 5

**Either:**

3. a) Let M and N be integers and suppose F (M, N) is recursively defined by. 5  
$$f(M, N) = \begin{cases} 1 & \text{if } M = 0 \text{ or } M \geq N \geq 1 \\ f(M-1, N) + f(M-1, N-1) & \text{Otherwise} \end{cases}$$
  
Find  
i) f (4, 2) ii) f (1, 5).  
b) Explain the memory representation of linked list. 5  
Discuss the advantages of list over array.

**OR**

- c) Define a Recursion and what are the properties of recursive algorithm? Discuss the disadvantages of recursion. **5**
- d) Write an algorithm to search an element in an unsorted list. **5**

**Either:**

4. a) Suppose the following sequences list the nodes of a binary tree T in preorder and inorder respectively. **5**  
 PREORDER : A B C D E F  
 INORDER : B A D E C F  
 Draw the tree T.
- b) Explain the spanning Tree and write a procedure to find cost of spanning tree using suitable example. **5**

**OR**

- c) What do you mean by leaves ? Write an algorithm to count the no. of leaves in a tree. **5**
- d) Discuss the terminology used in graph with suitable example. **5**  
 i) Mixed type graph.  
 ii) Out degree of graph.

5. Solve **all** the questions.

- a) Find the address of 10<sup>th</sup> element among 15 memory cells starting with base address=1000 and assume number of bytes required to store the data is 4 bytes. **2½**
- b) Explain the concept of multiple stack with suitable example. **2½**
- c) Draw a single linked list from the information given below. **2½**  
 Start : 2
- | SN | INFO | NEXT |
|----|------|------|
| 1  | P    | 4    |
| 2  | D    | 1    |
| 3  | A    | NULL |
| 4  | 7    | 3    |
- d) Write the standard ways of Postorder traversing a binary Tree T with root R. **2½**

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