B.E. Information Technology Fourth Semester

IT402 - Data Structures

P. Pages : 2 **GUG/W/18/1570**

Time : Three Hours Max. Marks : 80

Notes : 1. Same Answer book must be used for all questions.
2. All questions marks as indicated.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.

1. a) What is a data structure? Difference between primitive data structure & non – primitive data structure. **8**

b) Explain the different operation to be performed on data structures. **6**

c) What is difference between sorting & searching operation? **2**

OR

2. a) Explain the following sorting techniques : **8**
i) Bubble sort
ii) Insertion sort

b) Explain the following searching techniques : **8**
i) Linear search
ii) Binary search

3. a) Write a C function to count the number of nodes in a singly linked list. **8**

b) Differentiate between singly linked list and doubly linked list. **6**

c) State the advantages & disadvantages of linked list. **2**

OR

4. a) Explain Memory Allocation & Garbage collection. **8**

b) Write short notes on : **8**
i) Header linked list.
ii) Two way linked list.

5. a) Describe the basic operations performed on a stack. State its applications. **8**

b) Convert the following into postfix expressions : **8**
i) $(A*B+C)$
ii) $(A+B)*C/D+E\wedge F/G$
iii) $A-B/(C*D\wedge E)$
iv) $A+\left[(B+C)+(D+E)*F\right]/G$.

OR

6. a) Write short notes on : **8**
i) Multiple Queue
ii) Circular Queue

b) "Queue is called as "First – In – First – Out" (FIFO) type of list" Justify. **4**

c) Give two examples for the role of queues in computer system. **4**

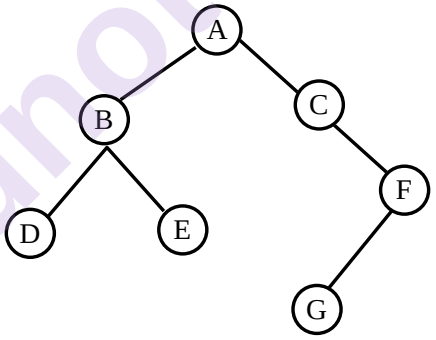
7. a) The following sequence gives the preorder & inorder of Binary tree T. **8**
Preorder : ABDGCEHIF
Inorder : DGBAHEICF
Draw the diagram of the tree T.

b) Difference between : **8**
i) Terminal nodes & non – terminal nodes.
ii) Binary tree & threaded Binary tree.

OR

8. a) Explain with suitable examples : **8**
i) B^+tree
ii) AVL tree

b) Consider the binary tree T shown, traverse it using : **8**
i) Preorder ii) Inorder
iii) Postorder



9. a) Define Graph. Explain its basic terminologies. Also, describe the 3 methods for the representation of graph. **10**

b) Write short notes on : **6**

i) Breadth first traversal.

ii) Depth first traversal.

OR

10. a) Explain Dijkstra's algorithm with suitable example. **8**

b) Write & explain, any one minimal spanning tree Algorithm, with proper example. **8**

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