PSG POLYTECHNIC COLLEGE, COIMBATORE - 641 004

Z12302 DATA STRUCTURES Semester: 3

Model Question Paper

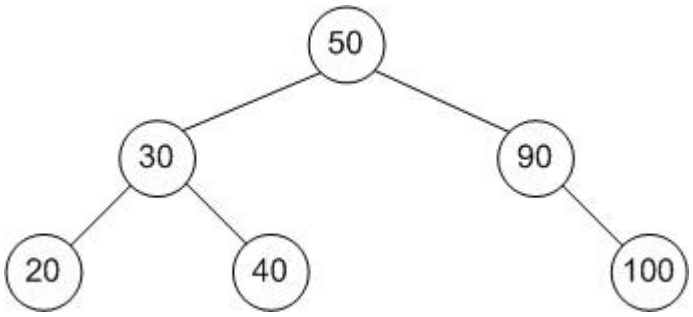
Time : 3 Hours **Max.Marks: 75**

Instructions:

1. **Group A** and **Group B** questions should be answered in the Main Answer book.
2. Answer any **TEN** questions in **Group A**. Each question carries two marks.
3. Answer **ALL** questions either **(a)** subdivision or **(b)** subdivision in **Group B**. Each question carries 11 marks.

Group – A **Marks: 10 x 2 = 20**

1. Define data structures.
2. What is a non primitive data structure? Give an example.
3. Differentiate between linear and non linear data structures.
4. What is the use of pointer head in the linked list?
5. State any two differences between static and dynamic memory allocation.
6. How do you insert an element in an array?
7. What do you mean by stack overflow?
8. What are the limitations of simple queue?
9. Convert the expression (P+Q)* C into postfix and show the contents of stack after every step in tabular form.
10. What is the order of nodes visited using a pre-order traversal in the following tree?



11. Give any two comparison of linked and sequential storage representation.
12. What are the applications of the trees?
13. Write the time complexities of bubble sort.
14. What is linear search? What is the average number of comparisons in a linear search?
15. What does a hash function do?

Group– B **Marks: 5 x 11 = 55**

16. a) What are the basic operations performed on any data structure? Explain in detail.

(OR)

b) What is a linear data structure? Explain any two linear data structures.

17. a) Explain any two array operation with an example.

(OR)

b) (i) Explain about the singly linked list.

(ii) Write the procedure for inserting a node in the linked list at given position.

18. a) (i) Explain how the following "infix" expression is evaluated with the help of Stack :

5 * (6 + 2) - 12 / 4

(ii) How do you push and pop elements in a stack.

(OR)

b) What are the types of queue? Explain with examples.

19. a) (i) Construct the binary tree for the following.

Inorder: 3 5 6 8 12 15 18 19

Preorder: 12 5 3 6 8 18 15 19

Postorder: 3 8 6 5 15 19 18 12

(ii) Describe any two types of binary tree.

(OR)

b) What is traversal in a binary tree? Explain with an example.

20. a) Explain the algorithm for Insertion sort and sort the following array .

77, 33, 44, 11, 88, 22, 66, 55.

(OR)

b) What is searching? Write an algorithm for binary search with an example.

/END/

Note :

i) Group A should have three questions from each unit.
ii) Group B should have two questions, subdivision (a) and subdivision (b) from each unit.
iii) In Group B,subdivision (a) / (b) may have two sections. Section [i] carries 5 marks and Section [ii] carries 6 marks.