

**FACULTY OF ENGINEERING**  
**B.E. 2/4 (CSE) (I Semester) (New) (Suppl.) Examination, June 2012**  
**DATA STRUCTURES USING C++**

Time : 3 Hours]

[Max. Marks : 75

*Note : Answer all questions from Part A.*  
*Answer any five questions from Part B.*

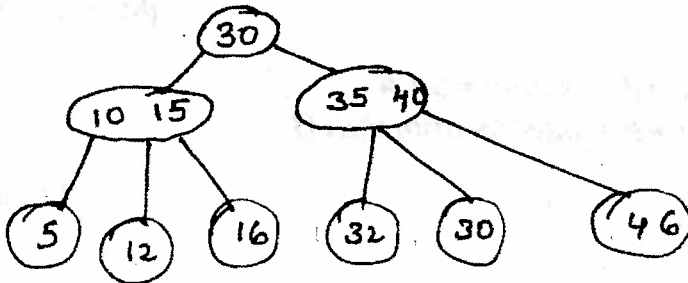
**PART – A****(25 Marks)**

1. What is a sparse matrix ? 2
2. Define time complexity. Explain Big Oh(0) notation. 2
3. Write "String Abstract Data Type" template in C++. 2
4. What is a weighted graph ? 2
5. Differentiate between dequeue 2 priority queue. 2
6. What are the applications of stacks ? 3
7. Explain Red-Black Trees with an example. 3
8. Define hash function. What do you mean by perfect hash function ? 3
9. State the difference between breadth first search and depth first search. 3
10. What are the advantages of linked lists for which operations linked lists are better than arrays ? 3

**PART – B****(50 Marks)**

11. Write C++ programs to implement.
  - a) stacks
  - b) queues
12. Write C++ programs to insert into and removal of items from a doubly linked list.
13. Write an algorithm for evaluating an expression in postfix form.  
 Consider the following infix expression  
 $((a+b) + c * (d+e)+f) * (g+h)$   
 Convert the expression to equivalent prefix and postfix expression.

14. a) Define B-tree.  
 b) What do you understand by order of a B-tree ?  
 c) Consider the following B-tree of order 3.



Show the B-tree after following sequence of operations :

Insert (43), insert 50, delete 15.

15. Illustrate merge sort with an example. Write the algorithm and explain its time complexity.
16. a) What is binary search tree ? List the advantages.  
 b) Write an algorithm to implement breadth first search.
17. Write short notes on the following :
- Difference between indexing and hashing
  - Spanning trees
  - Asymptotic notation.