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**Question Paper Code : 50433**

**B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017**

**Third Semester**

**Electronics and Communication Engineering**

**EC6301 – OBJECT ORIENTED PROGRAMMING AND**

**DATA STRUCTURES**

**(Common to : Biomedical Engineering/Medical Electronics/Robotics and  
Automation Engineering)**

**(Regulations 2013)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10×2=20 Marks)**

1. What is the output of the following program, if it is correct? Otherwise indicate the mistake:

```
int i=10;  
void main ()  
{int i=20;  
int i=30;  
cout<<i<<endl;  
}
```

2. List out the advantages of new operator over malloc[] function.

3. What is the Need for initialization of object using Constructor?

4. Give the syntax of a pointer to a function which returns an integer and takes arguments one of integer type and 2 of float type. What is the difference between a class and a structure?

5. What is an Abstract Data Type? What are all not concerned in an ADT?

6. Define a heap. How can it be used to represent a priority queue?



7. Draw the binary search tree for the following inputs : 70, 15, 29, 33, 44, 12, 79.
8. When a graph is said to be bi connected ?
9. List the applications of depth first traversal.
10. What is the feature of bucket sort algorithm ?

## PART - B

(5×13=65 Marks)

11. a) i) Write a program to demonstrate the use of Copy constructor. (7)  
ii) What is a destructor ? Explain it with an example. (6)  
(OR)
- b) i) What is a friend function ? What are the merits and demerits of using friend function ? (7)  
ii) Define a class 'string'. Use overload '==' operator to compare two strings. (6)
12. a) Discuss in detail about Multiple Inheritance model with syntax and example. Write a program to demonstrate the overloading of functions in base and derived classes. (13)  
(OR)
- b) i) Explain the difference between a Normal virtual function and Pure virtual function with example. (7)  
ii) What is an Abstract class ? Write a program for testing the debuggable class. (6)
13. a) i) Design an algorithm to reverse the linked list. Trace it with an example. (7)  
ii) Define an efficient representation of two stacks in a given area of memory with n words an explain. (6)  
(OR)
- b) i) Write an algorithm for inserting and deleting an element from Doubly linked list. (7)  
ii) Explain linear linked implementation of stack and queue. (6)



14. a) Explain Representing lists as Binary tree. Write algorithm for finding  $K^{th}$  element and deleting an element in binary tree with example program. (13)

(OR)

b) Discuss in detail about Kruskal's and Prim's algorithm for weighted undirected graph. (13)

15. a) i) Write a 'C++' program to implement binary search and compute its complexity. (7)

ii) List the worst case and best case time complexity of various sorting techniques. (6)

(OR)

b) Describe the merge sort using divide and conquer technique with suitable example. (13)

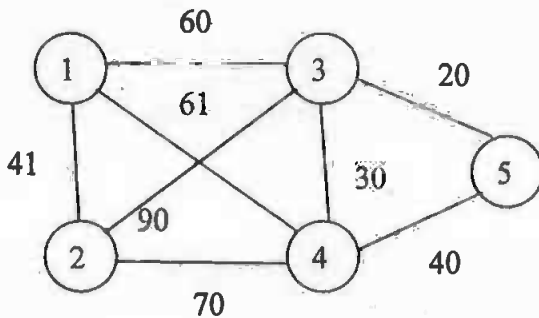
PART - C

(1×15=15 Marks)

16. a) Explain the algorithm of Quicksort by sorting the following set of numbers as an example : 42 47 52 57 62 37 32 27 22. Write the O/P for each iteration. (15)

(OR)

b) i) Convert the given graph with weighted edges to minimal spanning tree. (10)



ii) Write a short note on AVL trees. (5)

(5)

14. Let  $G$  be a graph with  $n$  vertices and  $m$  edges. Let  $D$  be the degree matrix,  $A$  be the adjacency matrix, and  $L$  be the Laplacian matrix. Show that  $L = D - A$ .

(10)

15. (a) Show that the Laplacian matrix of a graph is positive semi-definite. (b) Show that the Laplacian matrix of a graph is invertible if and only if the graph is connected.

(10)

16. (a) Write a code fragment to compute the sum of the squares of the elements of an array. (b) List the operations and their time complexities of the code fragment.

(10)

17. (a) List the operations and their time complexities of the code fragment. (b) Show the steps and write the code fragment.

(10)

18. (a) Explain the steps of the algorithm for finding the shortest path in a weighted undirected graph. (b) Write a code fragment to find the shortest path between two vertices in a weighted undirected graph.

(10)

(Total 10 marks)

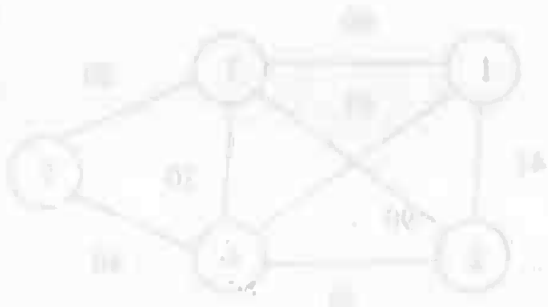
PART - II

19. (a) Explain the steps of the algorithm for finding the shortest path in a weighted undirected graph. (b) Write a code fragment to find the shortest path between two vertices in a weighted undirected graph.

(10)

20. (a) Convert the given graph with weighted edges to a weighted adjacency list. (b) Write a code fragment to find the shortest path between two vertices in a weighted undirected graph.

(10)



21. Write a code fragment to find the shortest path between two vertices in a weighted undirected graph.

(10)