Reg. No.							

B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019
Third Semester

EC18301 – OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES

(Electronics and Communication Engineering)

(Regulation 2018)

Time: Three Hours   Maximum : 100 Marks

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

		CO	RBT
1.	List the operators that cannot be overloaded.	1	R
2.	Can constructors be private in C++? Justify.	1	U
3.	What is an abstract class? Can objects be created for an abstract class?	1	U
4.	How are 'new' and 'delete' operators used in C++?	1	U
5.	What are underflow and overflow conditions in an array implementation of a Queue?	2	U
6.	Mention any two applications of a linked list.	3	AP
7.	State the use of in-order traversal of a binary search tree with an example.	3	R
8.	What are the various representations of a graph? Give an example for each.	2	R
9.	What are the time complexities of Quick sort and Merge sort in worst cases?	2	U
10.	Show the sequence of steps to search '40' in the list '12, 23, 34, 36, 38, 40' using binary search algorithm.	2	AP

PART B - (5 X16 = 80 Marks)

				CO	RBT
11.	(a)	Write a member function and a friend function to add two complex numbers.	(16)	1	AP

(OR)

				CO	RBT
	(b)	Write a member function to perform matrix addition and subtraction by overloading '+' and '-'respectively.	(16)	1	AP

12. (a) What are the different forms of inheritance supported by C++? Explain with relevant example code. **(16)**   1   AP

<div align="center">(OR)</div>

   (b) Explain run-time polymorphism in detail with an example. **(16)**   1   AP

13. (a) (i)   Write a C++ program to implement stack ADT using an array. **(8)**   2   AP

     (ii)   Convert the expression $((A + B) * C - (D - E) / (F + G))$ to equivalent postfix notation. **(8)**   2   AP

<div align="center">(OR)</div>

   (b) Write a C++ program to implement insert and delete operations in a singly linked list. **(16)**   2   AP

14. (a) Explain Depth First Search and Breadth First Search algorithms and perform the traversals for the following directed graph G with the vertices V={a,b,c,d,e,f,g} and the edges { (a,b), (a,d), (b,e), (b,d), (c,a), (c,f), (d,c), (d,e), (d,f), (d,g), (e,g), (g,f)}. **(16)**   3   AP

<div align="center">(OR)</div>

   (b) Let G be a weighted directed graph with the following sets: V={a,b,c,d,e,f,g}, The weights of the edges are given by { (a,b)=2, (a,d)=4, (b,e)=10, (b,d)=3, (c,a)=4, (c,f)=5, (d,c)=2, (d,e)=2, (d,f)=8, (d,g)=4, (e,g)=6, (g,f)=1}. Find the shortest path from vertex 'a' to remaining other vertices using Dijkstra's algorithm. **(16)**   3   AP

15. (a) Explain merge sort algorithm in detail. Sort the list of numbers: 72,11,83,64,10,29,87,46,45,2 using merge sort. **(16)**   4   AP

<div align="center">(OR)</div>

   (b) Explain quick sort algorithm in detail. Trace the iterations of quick sort algorithm to sort 7,1,3,4,10,9,8,6,5,2. **(16)**   4   AP