B.E./B.TECH Degree Examination, December2020

Third Semester

EC18301 - Object Oriented Programming and Data Structures

(Regulation 2018)

Time: Three hours Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. Which pointer denotes the object calling member function?
   a) Variable pointer
   b) This pointer
   c) Null pointer
   d) Zero pointer
2. How the constructors and destructors can be differentiated?
   a) Destructor have a return type but constructor doesn't
   b) Destructors can't be defined by the programmer, but constructors can be defined
   c) Destructors are preceded with a tilde (~) symbol, and constructor doesn't
   d) Destructors are same as constructors in syntax
3. Suppose you are given a binary tree with n nodes, such that each node has exactly either zero or two children. The maximum height of the tree will be
   a) n / 2 -1
   b) n / 2 +1
   c) (n - 1) / 2
   d) (n + 1) / 2
4. Given two vertices in a graph s and t, which of the two traversals Breadth first search(BFS) and Depth first search(DFS) can be used to find if there is path from s to t?
   a) Only BFS
   b) Only DFS
   c) Both BFS and DFS
   d) Neither BFS nor DFS
5. Give the significance of declaring a member of a class static.
6. Is abstract class used to create objects? Justify your answer in brief.
7. Define a graph. How it differs from tree?
8. Write a routine for insertion sort and give diagrammatic representation with example.

PART B - (4 X16 = 64 marks)

09. (a) (i) Consider fruit basket with no. of Apples and no. of Mangoes as data members. Write a C++ program to overload the '+" operator to add the two objects of this class. **(10)**

    (ii) What are the rules for overloading the operators? **(6)**

(OR)

(b) (i) Write a C++ program to perform string copy operation using dynamic constructor. **(8)**

(ii) Write the member function to find the greatest of two numbers using this pointer. **(8)**

10. (a) (i) Write a C++ program to create a base class house. There are two classes called door and window available. The house class has members which provide information related to the area of construction, doors and windows detail. It delegates the responsibility of computing cost of doors and window construction to door and window classes respectively. Write a C++ program to model the above relationship and find the cost of constructing the house. **(12)**

(ii) What is visibility mode? What are different inheritance visibility modes supported by C++? Give examples. **(4)**

(OR)

(b) (i) Consider base class base and derived class derived. Assume bptr is a pointer to base class and dptr is apointer to derived class. Write a C++ program to differentiate between these two pointers in terms of accessing the derived class object. **(8)**

(ii) Is it possible for a non member function to access the private members of a class? Explain with proper examples. **(8)**

11. (a) (i) Write a C++ program to return the position of an element X in a list L. Give diagrammatic representation with an example. **(8)**

(ii) Write a C++ program called REVERSE to reverse the linked list. Give diagrammatic representation with an example. **(8)**

(OR)

(b) (i) How do you push and pop elements in linked stack. **(8)**

(ii) Write a C++ program showing various operations on a circular queue. **(8)**

12. (a) Draw a binary search tree for the following input list 60,25,75,15,50,66,33,44. Trace the algorithm to delete the nodes 25,75,44 from the tree.Write a C++ program to perform insertion, deletion and traversals in BST. **(16)**

(OR)

(b) Using Dijiktra's algorithm, find the shortest path from the source vertex V3 to all other nodes of the graph 'G' given in figure, trace and write a suitable routine. **(16)**