Roll No. ....................

# TCS–307

## B. TECH. (CSE/IT)
### (THIRD SEMESTER)
## END SEMESTER EXAMINATION, 2018

OBJECT ORIENTED PROGRAMMING
WITH C++

**Time : Three Hours**

**Maximum Marks : 100**

**Note :** (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

### Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)

(a) When a class inherits from more than one base class, this is called ............. inheritance.

(b) A destructor function can be overloaded.

(True/False)

(c) The static member functions are the functions that can access only the static members.

(True/False)

(d) ........ header file is required for creating and manipulating data files in C++.

(e) Array can also be stored and manipulated dynamically using ...... and ............ operators.

B. TECH.

2. Attempt any *five* parts out of seven : (3×5=15 Marks)

(a) Following object declaration statement is producing an error :

Test T1; Test : T1;

What could be the possible reason for it?

(b) When will you make a function Inline and why?

(c) Differentiate between ifstream class and ofstream class.

(d) Discuss the two methods of opening a file within a C++ program.

(e) Differentiate between public and protected visibility in context of object oriented programming giving suitable examples for each.

(f) When does ambiguity arise in multiple inheritance ? How does one resolve it?

(g) What is "this" pointer ? Give an example to illustrate the use of it in C++.

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Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) How does the access of inherited members depend upon their access specifiers and the visibility mode of the base class ? Can private members of the base class be accessed by the derived class ? If yes, how ?

(b) Write a function in C++ which accepts an integer array and its size as arguments and replaces elements having odd values with thrice its value and elements having even values with twice its value.

(c) What is inheritance ? Discuss its various forms.

4. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) (i) Write a C++ program to illustrate friend function.

(ii) Write a C++ program to illustrate pure virtual function.

(b) Write a program in C++, which should read each character of a text file EXAM. TXT, should count and display the occurrence of alphabets A and U (including Small cases a and u too).

(c) Explain Exception-Handing in C++.

5. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Write a C++ function to update all the elements of a given 2D array except the secondary diagonal elements (the diagonal from bottom-left to top-right). Height and width of the matrix are also provided as arguments.

(b) What is Polymorphism ? How is it supported by C++?

(c) Write a C++ program to accept and print the employee details during runtime. The details will include name, designation, dept_id. The program should raise an exception if user inputs incomplete or incorrect data. The entered value should meet the following conditions :

(i) Employee name should be in uppercase and alphabets only.

(ii) Department id should be an integer between 1 and 5.

If the above conditions are not met then the application should raise in exception and execute Statement from appropriate catch classes.

6. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Write a C++ program to overload unary ++ operators.

(b) What are the different ways of passing parameters to the functions ? Which to use when ?

(c) Write a C++ program for the following : Define class named Test1 with the following description :

| Data Members | Description |
|---|---|
| String fname | To store First Name |
| Members Functions | Description |
| InputFirstName( ) | Input First Name |

Define another class named Test2 with the following description :

| Data Members | Description |
|---|---|
| String lname | To store Last Name |
| Members Functions | Description |
| InputLastName( ) | Input Last Name |

Define derived class named Test3 subclass of Test1 and Test2 with the following description :

| Data Members | Description |
| --- | --- |
| String name | To store Full Name |
| **Members Functions** | **Description** |
| MergeName( ) | Merge fname and lname into name |
| ShowName( ) | Print value of name after merging |

*End Semester Examination 2018*

*B.Tech (CSE) III Semester*

*Data Structure with 'C' language.*

Time: Three Hours                                                                    MM: 100

Note:
(i)     This question paper contains two sections.
(ii)    Both sections are compulsory.

### Section – A

Q1. Attempt all parts                                             (1X 5 = 5 Marks)

   a. Write equivalent prefix expression for the infix expression (4 *5)-3%2- (2^3).

   b. Write the name of data structure used in DFS.

   c. Which storage media is used in relative file organization?

   d. Write name of two techniques under rehashing.

   e. Write worst case complexity of Merge sort technique.
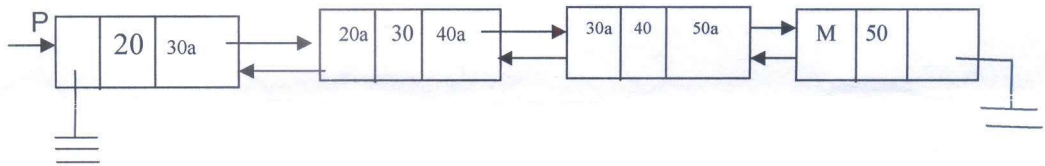
Q2. Attempt any five parts out of seven.                          (3 X 5 = 15 Marks)

   a. Explain sparse array with an example.

   b. Give memory representation of following directed graph.
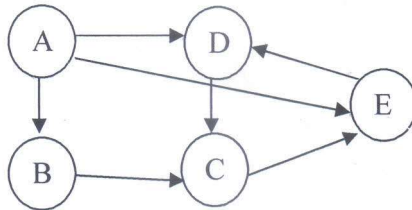


   c. Consider following doubly linked list :



   What will be the value of  P and M?

   d. Assume that you have a stack using linked list and Top pointer is pointing the latest node.
      Write a 'C' function to print stack in reverse order that is from bottom to top.

   e. Explain garbage collection and compaction with an example.

   f. Explain bucket addressing with an example.

   g. Explain working of selection sort technique with an example.

## Section – B

Each question contains three parts a, b & c. Attempt any two parts of choice from each question.

**Q3.**

(10X 2 = 20 Marks)

a. Write application of B tree. Draw a B tree of order 4 with following keys.
4,3,2,11,12,5,6,1,7,13,14.

b. Explain Huffman's algorithm. Using Huffman's algorithm encode following signal.
c c c c e e d d d e e d a a a a b b b b c c d e d e a c b e c a e.

c. Apply a graph traversal technique to find a path from Node A to F with minimum number of nodes, in the following graph.



**Q4.**
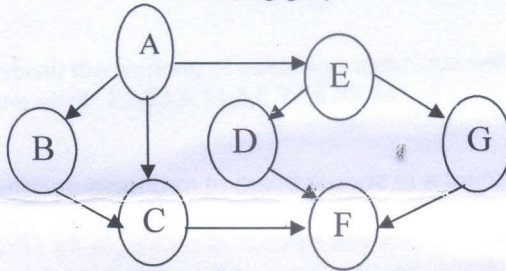
(10X 2 = 20 Marks)

a. Explain sequential file organization and multi-key file organization with an example.

b. Give linked representation of following graph.
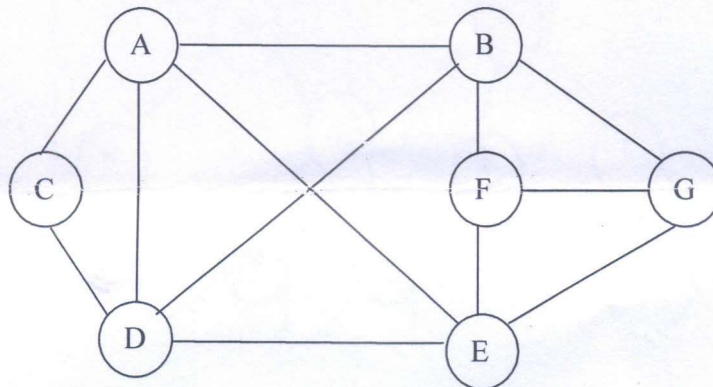


c. Write a 'C' function to insert a node in doubly linked list at right hand side then count all nodes with odd information (use double *pointer*, use separate function to count node).

**Q5.**                                                      (10X 2 = 20 Marks)

a.  Explain AVL tree .Draw an AVL tree with following keys 5,6,8,1,3,8,9,10,11,12,4,7.

c.  Explain minimal spanning tree, Write application of minimal spanning tree. Draw a
     minimal spanning Tree from given graph using  Kruskal's algorithm.
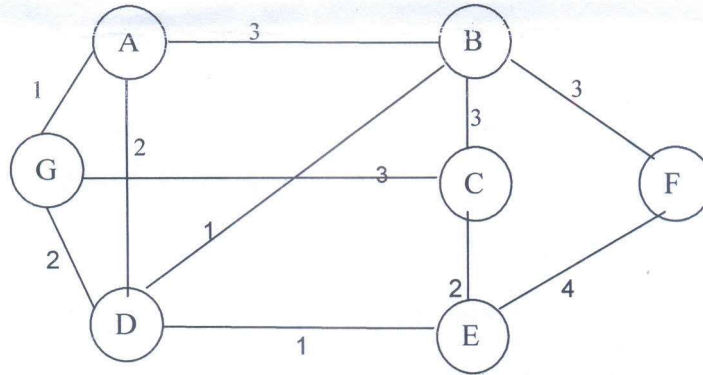


c. Explain the working of quick sort technique with following unsorted sequence to produce sorted
    sequence. 22,33,4,11,5,6,77,8,99,44.

**Q6.**                                                      (10X 2 = 20 Marks)

a. Write an algorithm to insert a node in a binary search tree.

b. Write an algorithm to convert any infix expression to postfix expression.
    Convert following infix expression into postfix expression using stack:
    Infix expression:  (A-B %(C*D^E%F/G))

c. Write the advantage of threaded binary tree. Perform left and right threading on following
    binary tree.