H Roll No. .....

TCS/TIT–303

B. TECH. (THIRD SEMESTER)
END SEMESTER EXAMINATION, 2018

OOPs USING C++

Time : Three Hours

Maximum Marks : 100

Note : (i) This question paper contains five questions with alternative choice.

(ii) All questions are compulsory.

(iii) Each question has three Parts (a), (b) and (c). Attempt any *two* Parts of each question.

(iv) Total marks assigned to each question are **twenty.**

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

(a) (i) What will be output of the following code ? Give reason to justify your answer.

```
#include<iostream>
using namespace std;
#define x 5+2
```

```
int main ()
{
    int i;
    i = x*x*x;
    cout <<i;
    return 0;
}
```

(ii) What will be output of the following code ? Give reason to justify your answer.

```
int main ()
{
    int a = 8;
    cout <<(a>>3);
    return 0;
}
```

(iii) What will be output of the following code ? Give reason to justify you answer.

```
int main ()
{
    char * p;
    cout << size of (*p);
    cout <<size of (p);
    return 0;
}
```


(iv) What will be output of the following code ? Give reason to justify your answer.

```
class Test
{
  static int a;
};
int main ()
{
  Test t1;
  cout <<sizeof (t1);
}
```

(v) What will be output of the following code ? Give reason to Justify your answer.

```
int main ()
{
    int a [5] = {10, 20, 30, 40, 50};
    cout <<a [3];
    cout <<3 [a];
    return 0;
}
```

(b) (i) Write any *five* new operators introduced in C++ with their meanings. 5

(ii) Explain "using namespace std" with suitable example. 5

(c) (i) How does OOP overcome the shortcomings of traditional programming approaches ? 5

(ii) Difference between Static memory allocation and Dynamic memory allocation with example. 5

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

(a) (i) What will the order of the constructor invocation of the following code : 2

```
class date
{
};
class time
{
};
class train
{
date ddate;
time dtime;
};
void main ()
{
data d1;
time t1;
train tr1;
}
```


(ii) How are the following two statement different ? 2

Date D2 = D1;

D2 = D1;

(iii) Reusability of classess is one of the major properties of OOPs. How is it implemented in C++ ? 2

(iv) What is the significance of access specifier in a class ? 2

(v) Why can't we pass an object by value to a copy constructor ? 2

(b) Imagine a tollbooth at a bridge. Cars passing by the booth are expected to pay a ₹ 50 toll. Mostly they do, but sometimes a car goes by without paying. The tollbooth keeps track of the number of cars that have gone by, and of the total amount of money collected.

Model this tollbooth with a class called TollBooth. The two data items are a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both of these to 0. A member function called paying Car () increments the car total and adds 50 to the cash total. Another function, called nopayCar (), increments the car total but adds nothing

to the cash total. Finally, a member function called display() which displays the total number of cars and total money collected. Use static data member/static member function if required.

Create a menu drive program for the above scenario.

(i) Paying Car

(ii) Non Paying Car

(iii) Display

(iv) Exit

(c) Differentiate between Constructor and Destructor. Also write a program to overload constructor.

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

(a) (i) Discuss all the three cases of friend function. 5

Case 1 : When friend function is friend of two classes.

Case 2 : When friend function is member of one class and friend of another class.

Case 3 : Friend class

(ii) Write a program to swap the private data members of two different classes. 5

(b) Create a class Location with data members Longitude and Latitude.

Write a C++ program to overload the following operators using member functions :

(i) >>operator : to input the data members

(ii) << operator : to display the data members

(iii) ++ operator : to increment the location

(iv) -- operator : to decrement the location

(v) - operator : to find the difference between two locations.

(c) What are the rules to overload operators through member function and through friend function ? Also list the operator which we cannot overload through member function and through friend function ?

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

(a) Discuss the Diamond problem and give possible solution with program.

(b) Define pure virtual functions. Create a base class called Shape. Use this class to store two double type values that could be used to compute the area of figure. Derive two specific classes called Triangle and Rectangle from the base class Shape. Add to the base class, a member function get_data () to initialize base class data members and another member function display_area () to compute and display and compute the area of figures. Make display_area () as a virtual function and redefined this function in the derived classes to suit their requirements.

Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively, and display the area.

Remember the two values given as input will be treated as lengths of two sides in the case of rectangles, and as base and height in the case of triangles, and used as follows :

Area of rectangle = x*y

Area of triangle = 1/2*x*y

(c) (i) What is the importance of using inline function ? Explain with example. 5

(ii) Explain the importance of this pointer with programming example. 5

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

(a) Attempt any *five* questions :

State what will happen in the following situations :

(i) An exception is thrown outside of try block;

(ii) No catch handler matches the type of exception thrown.

(iii) Several handlers match the type of exception thrown.

(iv) A catch handler throws an exception.

(v) A function throws an exception of type not specified in the specification list.

(vi) catch (....) is the first cluster of catch handler.

(vii) Placing throw () in a function header line.

(viii) An exception rethrown within a catch block.

(b) Assuming that a text file named FIRST.TXT contains some text written into it, write a function named vowelwords(), that reads the file FIRST. TXT and creates a new file named SECOND. TXT, to contain only those words from the file FIRST.TXT which start with a lowercase vowel (i. e., with 'a', 'e', 'i'. 'o', 'u').

For example, if the file FIRST.TXT contains

Carry umbrella and overcoat when it rains

Then the file SECOND.TXT shall contain

umbreall and overcoat it.

(c) What is STL ? How is it different from the C++ standard library ? Why is it gaining importance among the programmers ?