Supplementary Mid-Semester Examination – 2018
Object Oriented Programming
[IT 1002]

Full Marks: 30   Time : 1.5 Hours

(Answer any 5 questions, including Question no. 1)

1. Answer all the questions   [2*5]

    i. Write the output of the following code with your justification.

```cpp
#include<iostream>
#include<string.h>
using namespace std;
class String{
        char *str;
public:
        String(const char *s);
        void change(int index, char c) { str[index] = c; }
        char *get() { return str; }
};
String::String(const char *s){
        int l = strlen(s);
        str = new char[l+1];
        strcpy(str, s);
}
int main() {
        String s1("geeksQuiz");
        String s2 = s1;
        s1.change(0, 'G');
        cout << s1.get() << " ";
        cout << s2.get();
}
```

    ii. "Size of an object is equal to the sum of the sizes of the data members and member functions in the class". Justify the correctness of the statement.

    iii. If memory is allocated by using new operator and delete operator is not used then when the memory will be released?

    iv. Differentiate between private and protected data members in c++.

    v. Write the output of the following code with your justification.

```cpp
class Test {
private:
        int x;
public:
        Test(int x = 0) { this->x = x; }
        void change(Test *t) { this = t; }
        void print() { cout << "x = " << x << endl; }
};
int main() {
        Test obj(5);
        Test *ptr = new Test (10);
```

```
        obj.change(ptr);
        obj.print();
        return 0;

    }
```

2. a) Write a program using c++ to define a class "Year" that has private data members "month", "weak", and "day". Create another class "Day" that has a private data member "totaldays" which is entered by user. Calculate the equivalent months, weeks, and days and assign to the "year" class data member by using necessary convertion routines. [3]

   b) Write a c++ program to create a template to find the maximum value stored in an given array. [2]

3. a) Define the purpose of operator overloading. Whether binary '+' operator can be overloaded in the following statement or not?

   X=50+X (X is an object of an user define class "Demo")

   If '+' operator can be oveloaded in the above scenario then provide the definition for the same. [3]

   b) Descibe the need of static member functions and Justify why the static member functions are called by the class name rather than the object name. [2]

4. a) Write a c++ program to enter the name of a student to a file called "Test.txt". Display the name of the student in reverse order by reading from the file. [3]

   b) Write a program in c++ that will demonstrate the concept of rethrowing an exception. [2]

5. a) Explain the use of an abstract class. Create an abstract class "GeomShape" which includes a function calculate_area(). Derive classes "GeomLine", "GeomRectangle", "GeomTriangle" from "GeomShape" class and find the area of each geometrical shape using a base class pointer. [3]

   b) "A copy constructor takes reference to the object as its argument". Justify the statement with an example . [2]

6. a) Suppose a class is derived in private mode and it's base class is having both default and parameterized constructors then explain how the base class parameterized and default constructors are executed with an example. [3]

   b) What is this pointer? Show it's application by suitable example. [2]

7. Write a c++ program to enter the e-mail id of a person. Validate the e-mail id by checking the following conditions. If any one of the condition violates then the program must generate an exeception. Use proper Exception handling technique. [5]
   i) It must have '@' symbol in the middle of the string.
   ii) The string must be terminated with ".com"