BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations (January 2020 Term)

Sub: **CSE 107** (Object Oriented Programming Language)

Full Marks: 180 Section Marks: 90 Time: 2 Hours (Sections A + B)

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

All the questions in this section are related with C++ programming language

1(a) A "Student" class has a private variable to store ID, a constructor without parameter to initialize ID and a private static variable. Write the code segment for Class "Student" and to create an array of 120 objects of "Student" class in the main function using 'new' operator. IDs of 120 "Student" objects are initialized in the constructor as 1, 2, …, 120, respectively. (10)

1(b) Explain what a default copy constructor generated by the compiler do and briefly describe a circumstance where this will cause a problem? (10)

1(c) Which feature of C++ programming language do you like most and why? The feature that you mention should not be also a feature of C programming language. (10)

2(a) Differentiate between function overloading and function overriding. (8)

2(b) If you overload operator+, you must return an object of the same type as your parameters. Do you agree? Justify your answer. (7)

2(c) "There are scenarios when a friend function is very useful for operator overloading"- support this statement for the following class 'Rational' by writing a program that has to use friend function for operator overloading. (15)

```
class Rational
{
   // numerator and denominator
   int n, d;
   public:
      //Constructor(s) to initialize n and d
      Rational()
      {
         n=0;
         d=0;
      }
      Rational(int a, int b)
      {
         n=a;
         d=b;
      }

      …

};
```

3(a) Write an example program to explain the order of execution of constructor functions for multilevel inheritance and multiple inheritance. (15)

3(b) Differentiate between compile time polymorphism and run time polymorphism. (8)

3(c) Describe a scenario when we cannot create an object of a class. (7)

4(a) What is wrong with the following statement? (5)

```
void func(int x = 99, int y);
```

4(b) Write three ways to declare an object of string class. (8)

4(c) Given the following class declaration 'Date', overload the binary minus operator so that an expression like ob1-ob2 will give the difference between the two Date objects in number of days, where ob1 and ob2 are objects of Date class. For simplicity of calculation assume that all months have 30 days. Also overload left shift operator so that an expression like cout<<ob will print day-month-year (e.g., 17-1-2021), where ob is an object of Date class. Include a main() function where these operators will be used. (17)

```
class  Date{
        int day, month, year;
        public:
        Date(int m, int d, int y){
                day=d;
                month=m;
                year=y;
        }
        …
};
```