Department of Electrical & Computer Engineering

EE 553 – Engineering Programming: C++

Quiz3 2022

Total points 100

Question 1: Pointer (20 points)

What is the expected output of the following code? Explain why?

```
#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("stevensQuiz");
   String s2 = s1;
   s1.change(0, 'G');
   cout << s1.get() << " ";
   cout << s2.get();
}
```

Question2: C++ Concepts - True/False (20 points)

1. The expressions *ptr++ and ++*ptr are equivalent. [ ]

2. A multithreaded process can be more efficient but less secure than the multi-process (by creating child processes for multiple instruction flows) approach [ ]

3. All exceptions need to be reported to avoid complications errors. [ ]

4. In multi-threading, the c++ code between lock and unlock called a non-mutex code [ ]

5. Preprocessor directive are not c++ statements and as such should not end with semicolon. [ ]

Question 3 C++ code (20 points)

Trace the following c++ code to answer the below questions

```
1  #include <iostream>
2  using namespace std;
3  template <typename T>
4  void fun(const T&x)
6  {
7      static int count = 0;
8      cout << "x = " << x << " count = " << count << endl;
9      ++count;
10     return;
11 }
12
13 int main()
14 {
15     fun<int> (1);
16     cout << endl;
17     fun<int>(1);
18     cout << endl;
19     fun<double>(1.1);
20     cout << endl;
21     return 0;
22 }
23
```

What is the expected output of line #15,#17,#19 (the three lines include cout function)?

Question 4 Pointers and Access Specifiers (20 points)

Given the below code, try to answer the following questions

```
#include<iostream>

using namespace std;

class Test {
  private:
    int y;
    int x;
  public:
    Test() : x(10), y(x + 10) {}
    void print();
};

void Test::print()
{
   cout<<"x = "<<x<<" y = "<<y;
}

int main()
{
    Test t;
    t.print();
    getchar();
    return 0;
}
```

1. What is the expected final output?	

2. Propose c++ code to fix the problem of printing the variables given on the above code.	

Question 5 Multiple Choices (20 points)

1. Abstract class cannot be instanced
   a. True
   b. False

2. Trace the following code

```
#include <iostream>
using namespace std;

template <int i>
void fun()
{
   i = 20;
   cout << i;
}

int main()
{
   fun<10>();
   return 0;
}
```

   a. Compilation error due to lvalue
   b. Compilation error due to rvalue
   c. 10
   d. None of the above

3. Base class and derived class relationship comes under

   a. Inheritance
   b. Polymorphism
   c. Encapsulation
   d. None of the above

4. Functions that can be inherited from base class in C++ program
   a. Constructor
   b. Destructor
   c. Static function
   d. None