THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAM: LEVEL 05
OPEN BOOK TEST 2009/2010
CSU 3279 – OBJECT ORIENTED PROGRAMMING
DURATION: One and Half hours

Date: 11/09/2009 **Time: 4.00pm – 5.30pm**

Answer All Questions

QUESTION 1

1.1) State whether the following statements are **True** or **False**.

a) C++ keywords can be redefined by the programmer.
b) *2rrowWeather* is a valid C++ variable name.
c) *const float pi = 3.141;* is a valid constant definition in C++.
d) The statement *cout >> "Hello friend";* displays the message *Hello friend* on the screen.
e) The statement *x = 25/4;* stores *6.25* in the variable *x*.
f) The data type *int* can store only non-negative integers.
g) The value of the controlling variable or the controlling expression of a switch statement can be of data type *float* or *double*.
h) The loop control variable(s) of a 'for loop' must be of integer data type.
i) The 'continue' statement and the 'break' statement perform in a similar way during the execution of a C++ program.
j) A C++ array can hold data elements of different data types.

1.2) What data types would you use to represent the following items? Briefly explain why you selected that specific data type for each item.

a) Population of the world.
b) Fuel usage of a car.
c) Student's surname of a student database.
d) The distance from the earth to the sun (in kilometers).
e) Weight of an ant.

1.3) Write C++ expressions for the following mathematical formulae. Avoid writing unnecessary parentheses.

a) $b^2 - 4ac$

b) $\sqrt{x^2 + y^2}$

c) $\left(x - \frac{y}{5}\right)\left(\frac{x+y}{x-y}\right)^3$

d) $\frac{1}{\sigma\sqrt{2\pi}} e^{\left\{\frac{-(x-\mu)^2}{2\sigma^2}\right\}}$

e) $\mu_0 \frac{T_0 + C}{T + C}\left(\frac{T}{T_0}\right)^{3/2}$

QUESTION 2

2.1) Determine the value of each of the following. Write your steps clearly.

a) $8 * 9 + 2$ b) $6.0 * 3 / 4$ c) $5 + 1 \;\&\&\; 10$

d) $5 > 10 \,\|\, -6$ e) $!(10 > 12) \,\|\, 5 \,\%\, 2 == 0$

2.2) a) Declare an array of five *ints* and initialize it to the first five odd positive integers.

b) Write a C++ for loop to obtain the sum of the first five odd positive integers stored in the array in part (a).

c) Use *enum* to define a type called *Response* with the possible values *Yes*, *No*, and *Maybe*. *Yes* should be 1, *No* should be 0, and *Maybe* should be 2.

d) What would the following code fragment print if it was a part of a valid program?

```
int j = 5;
while ( ++j < 9)
        cout << j++ << "\n";
```

e) What would the following code fragment print if it was a part of a valid program?

```
int k = 8;
do
      cout <<" k = " << k << "\n";
while (k++ < 5);
```

2.3) Find the syntax errors and logical errors of the following program segment that was written to convert from degrees Celsius to degrees Fahrenheit.

```
float celsius
cout << 'Celsius value = ';
cin << celsius;
float fahrenheit = 32 + 9/5 * celsius;
cout << 'Equivalent Fahrenheit value = ' << Fahrenheit << '\n';
```

[**Help:** $fahrenheit = 32 + \frac{9}{5} celsius$]

QUESTION 3

3.1) What are the three steps in using a function?

3.2) Construct function prototypes that match the following descriptions:

a) iceAge() takes no arguments and has no return value.

b) ben10() takes an int argument and returns a float.
c) mpg() takes two type float arguments and returns a double.
d) sumArray() takes the name of a long array and an array size as values and returns a long value.
e) swap() takes two ints, has no return value and must swap two ints.

3.3) Write C++ functions to perform the following tasks.

a) printArray() takes an array of floats and size of the array as arguments and prints the elements of the array.
b) sumArray() takes an array of floats and size of the array as arguments and returns the sum of the elements of the array.
c) sumOfSquares() takes an array of floats and size of the array as arguments and returns the sum of squares of the elements of the array.

3.4) Write C++ codes to obtain the standard deviation of 10 floats $x_0, x_1, \ldots, x_9$ using the functions defined in part (3.3).

[**Help:** Standard Deviation $= \frac{\sum_{i=0}^{9} x_i^2 - \sum_{i=0}^{9} x_i}{9}$]