



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 2, Examination in Engineering, November 2017

Module Number: EE2201 Module Name: Object Oriented Programming

Part B

[2 hours]

[Answer all questions]

- Q1.** a) What are the differences between a constructor and a method in a class? [1.5 marks]
- b) What is the difference between a copy constructor and an overloaded assignment operator? [2 marks]
- c) Write a class Point using C++ syntax with following requirements. [4 marks]
- Integer x , y coordinates as member variables.
 - A parameterized constructor which takes x , y coordinates as arguments.
 - A function which returns the distance from origin to the point.
 - A copy constructor.
 - An Overloaded assignment operator.
- Q2.** a) Explain the following access modifiers. [1 mark]
- i) public
 - ii) private
- b) Describe the following terms found in Object Oriented Programming. [3 mark]
- i) Encapsulation
 - ii) Inheritance
 - iii) Polymorphism
- c) Create the following program using C++ syntax.
- i) Create a Shape class with Color and Area as member variables. Create a parameterized constructor and destructor for the class.

- ii) Inherit Rectangle class from Shape class and include Width and Height as member variables. Create parameterized constructor and destructor for the class.
- iii) Explain the order of execution of constructors and destructors when a Rectangle is created and destroyed.

[3.5 mark]

Q3. a) Explain the difference between regular variable and pointer type variable in C++. [2 marks]

b) An array ARY of 10 integers is created using C++ language.

- i) Show the memory representation of the array and variable ARY using a diagram.
- ii) What is the value contains in variable ARY.
- iii) What is the meaning of $*(ARY + 5)$
- iv) Explain what happens when the expression `int* A = ARY;` is executed.

[4 marks]

c) Write a method which takes two integers as input parameters and swap the values of those variables using pointer variables. [1.5 mark]

Q4. Create a class called Matrix to represent two dimensional matrices using C++ syntax. The matrix should store double precision floating point numbers.

a) Provide a constructor which takes number of rows and number of columns as parameters. The constructor should allocate memory and initialize all the numbers to zero.

[2 marks]

b) Create a destructor which deallocate all the allocated memory.

[1.5 marks]

c) Write two public methods that perform following operations:

i) Add a Matrix class object with same dimensions to the matrix which this method belongs and return the results in a same sized new Matrix object.

[2 marks]

ii) Multiply the Matrix class with a constant and return the results in a same sized new Matrix object.

[2 marks]