



**UNIVERSITY OF GHANA**

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**B.SC INFORMATION TECHNOLOGY, FIRST SEMESTER**

**EXAMINATIONS: 2015/2016**

**CSIT 205: OBJECT ORIENTED TECHNIQUES FOR IT PROBLEM SOLVING (3 CREDITS)**

**INSTRUCTION:**

*Answer Question One (1) and any other three (3) Questions*

**TIME ALLOWED:**

*TWO AND A HALF (2½) HOURS*

**QUESTION 1 [Short Answer questions] [25 marks]**

**Write answers to this question clearly in your answer booklet.**

1. Name two types of errors you may encounter in developing a program.

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1. What starts the execution of an event procedure? -----
2. List two primary components of the .Net Framework. -----
3. One main difference between a function and subroutine is -----
4. List two examples of VB.NET namespaces are -----
5. Write the code for setting the Text property of a control named 'txtnumber' to an empty text string. -----
6. Two approaches to program design include: -----

7. Two primary logical programming constructs are -----
8. An **event** occurs whenever an ----- detects an ----- and responds by running a method called an -----

9. An event-driven system is a computer system where -----
10. A calling program in VB may pass parameters to the called program in either of two ways, ----- or -----
11. Today, many popular programming languages such as: -----, ----- support object oriented programming (OOP).
12. An object is an instance of -----.
13. Two (2) short reasons why you would not use natural language in designing algorithms are -----
14. **Option Explicit On** in a VB program means what? -----

**Question 2 [25 marks]**

- a) i. What are classes and objects?  
 ii. Explain the dot notation for referencing an object's properties, methods and events, giving one example each. **[8 marks]**

- a) i. Write a pseudo code to define a class Distance with feet and inch and with a print function to print the distance. **[4 marks]**

- II. Write a non-member function Max which returns the larger of two distance objects, which are arguments. **[4 marks]**

- II. Write the pseudo code of a main program that accepts two distance objects from the user, compare them and display the larger. **[9 marks]**

**Question 3 [25 marks]**

a) Explain clearly the structure of a general Sub procedure (ie. a subroutine) and the syntax for calling a Sub procedure in another program in VB.NET **[6 marks]**

a) Using a diagram, describe briefly what happens in an event-driven (programming) system. **[8 marks]**

a) With the help of a diagram, briefly describe the Execution model of the Common Language Runtime (CLR) in VB.NET and its components. **[11marks]**

**Question 4 [25 marks]**

a) What is Object Oriented Programming (OOP)? What are the benefits of object oriented programming? Explain. [8 marks]

a) Explain any three drawbacks or shortcomings of procedure-oriented languages. [6 marks]

a) Design an algorithm to find all the common elements in two sorted lists of numbers. For example, for the lists 2, 5, 5, 5 and 2, 2, 3, 5, 5, 7, the output should be 2, 5, 5. What is the maximum number of comparisons your algorithm makes if the lengths of the two given lists are  $m$  and  $n$ , respectively? [11marks]

**QUESTION 5 [25 marks]**

**Table ASSESSMENT** shows assessment of students registered in courses.

Student ID	Course ID	year	semester	Mark %	
20061501	CSIT205	2007	2	80	
20061501	MATH412	2007	1	48	
20061769	STAT102	2007	2		
20061769	CSCD216	2006	1	62	
:	:	:	:	:	:
:	:	:	:	:	:

The table ASSESSMENT above is part of a database table created in a database called UGLEGON using SQL Server.

The Grade is determined as follows: mark  $\geq 80$ , A

80 > mark  $\geq 70$ , B

70 > mark  $\geq 60$ , C

60 > mark  $\geq 50$ , D

50 > mark, F

a) Write a VB function called Grade( ) which accepts the mark of a student and returns the Grade to the program that calls it. [7 marks]

a) Write a Visual Basic procedure that :

- I. makes a connection to the database and creates a dataset **[5 marks]**
- II. uses SQL to add a new 5-character text field called Grade to the Assessment table. **[3 marks]**
- III. gets the mark of a student from the database and calls the VB function Grade() above to find the grade and **[4 marks]**
- IV. updates the Grade column of every record in the Assessment table **[3 marks]**

Your application must check for missing marks or some error in marks and use MsgBox() / MessageBox.Show to display a prompt. **[3 marks]**

**Question 6** [25 marks]

a) Define the following terms related to the Object Oriented Paradigm:

Encapsulation, Inheritance, Polymorphism, Data Abstraction [8 marks]

- a) i. What is the formal definition of an algorithm?
- ii. Explain the four (4) parts of this definition.
- iii. Computer scientists use pseudo-code to express algorithms: describe three basic kinds of operations used to express algorithms. [12marks]

a) **Nested If** statements are difficult to read. Re-write this segment using **Select Case**.  
[5 marks]

```
Dim temp As Integer = -32
If temp > 32 Then
    Console.WriteLine("Safe driving...")
ElseIf temp = 32 Then
    Console.WriteLine("Warning, 32 degrees ..")
ElseIf temp > 0 Then
    Console.WriteLine("Watch for ice...")
ElseIf temp = 0 Then
    Console.WriteLine("Temperature = 0")
Else
    Console.WriteLine("Temperatures Wicked Cold!")
End If
```