



**UNIVERSITI KUALA LUMPUR  
Malaysia France Institute**

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**FINAL EXAMINATION  
JANUARY 2010 SESSION**

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**SUBJECT CODE** : FSB 23103  
**SUBJECT TITLE** : OBJECT ORIENTED PROGRAMMING  
**LEVEL** : BACHELOR  
**TIME / DURATION** :  
**DATE** :

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**INSTRUCTIONS TO CANDIDATES**

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1. Please read the instructions given in the question paper **CAREFULLY**.
  2. This question paper is printed on both sides of the paper.
  3. Please write your answers on the answer booklet provided.
  4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
  5. This question paper consists of **TWO (2)** sections. Section A and B. Answer all questions in Section A. For Section B, answer three (3) question only.
  6. Answer all questions in English.
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**THERE ARE 7 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.**

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**SECTION A (Total: 40 marks)****INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

- (a) Discuss the difference between procedural programming and Object Oriented Programming (OOP). Name one programming tool that enables to write for procedural programming and an OOP.

(4 marks)

- (b) Explain briefly about object and inheritance which are basic principles characteristic of an OOP.

(2 marks)

- (c) Identify five (5) errors in the following section of codes (state the line and correct it).

(5 marks)

```
Line 1 :      Public Class Account
Line 2 :      Dim bal As Double
Line 3 :      //constructor
Line 4 :      Public Sub Old(ByVal, iniAmount As Double)
Line 5 :          bal = iniAmount
Line 6 :      End Sub
Line 7 :
Line 8 :      Public Sub Deposit(ByVal amount As Double)
Line 9 :          bal += amt
Line 10 :      End Sub
Line 11 :
Line 12 :      Public Sub Withdraw(ByVal amount As Double)
Line 13 :          Me.bal -= Me.amount
Line 14 :      End Sub
Line 15 :
Line 16 :      Public ReadOnly Property currentBalance() As Double
Line 17 :          Get
Line 18 :              Return bal
Line 19 :          End Set
Line 20 :      End Property
Line 21 :      End
```

- (d) Based on Figure 1, suggest two classes and identify one object for each class.

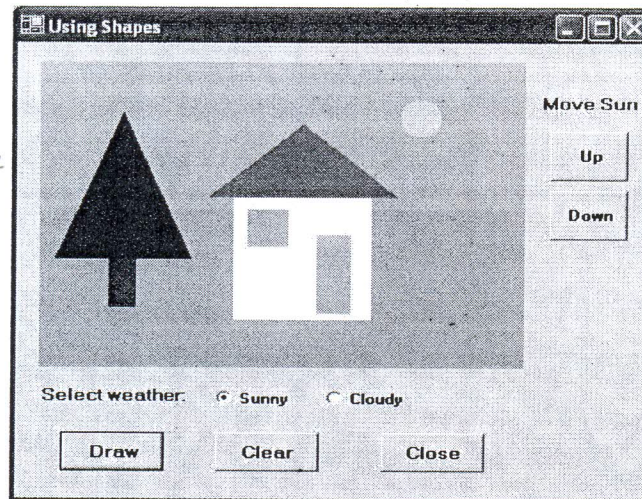


Figure 1: Objects and Classes

(4 marks)

- (e) Explain the following term:
- i. Class instance variable.
  - ii. Class behaviour.
  - iii. Class Constructor.
  - iv. Dim keyword.
  - v. Public keyword.

(5 marks)

## Question 2

- (a) Draw an UML Diagram that represent a `SwarmR` class with the following class members :
- i. Instance variables `payload`, `speed` and `dof`
  - ii. Class method `Forward()` and `Reverse()`
- (5 marks)
- (b) Assume, a `SwarmR` class has been defined. A `SwarmR` class constructor has three parameters that hold payload 10kg, speed 4.12 rad/s, 3 dof values. Write a segment of code to instantiate `swarm001` object of a `SwarmR` class.
- (2 marks)

- (c) Given the object name called Robot100. Write a segment of code in VB.Net to declare a new connection SqlConnection object, Robocon with the connection string as "File 001". Assume, the connection derived from System.Data.SqlClient.SqlConnection.

(3 marks)

- (d) Given the Price class definition as shown in Figure 2:

```
Public Class Price
    Private item As String
    Private price As Decimal
    Private quantity As Integer

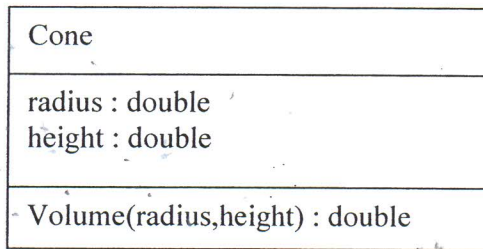
    Public Sub New()
        item = " "
        price = 0.0
        quantity = 0
    End Sub

    Public Function Amount() As Decimal
        Return quantity * price
    End Function

End Class
```

**Figure 2 : Price class definition**

- i. List all class members that can be found on the above class?  
(3 marks)
- ii. Write a segment of code to define another constructor that has three parameters according to the class instance variables. (Use Me keyword)  
(4 marks)
- iii. Write a segment of code for a class property of item that the function is to access or change the state of an object  
(3 marks)

**SECTION B (Total: 60 marks)****INSTRUCTION: Answer THREE (3) questions only.****Please use the answer booklet provided.****Question 3**Given an UML diagram as shown in **Figure 3**:**Figure 3 : UML Diagram**

- (a) Write a code to define `Cone` class that consider to the following criteria
- Define multiple constructors; first define default constructor (no parameter) and set the radius to 5 and height to 10; second constructor with two parameters that will accept two values; radius and height (Use `ByVal` keyword to hold parameter)
  - Include appropriate class property and add a function method that will return the `Volume` value. Use the formula as shown below:

$$\text{Volume} = 1/3\pi r^2 h$$

(Use the `Math` Class to perform the calculation and  $\pi = 3.142$ )

(15 marks)

- (b) Write a short program that use `Console Application` that will instantiate the object `cone` with two parameters (remember to use `New`) and display the result calculate for the volume of a cone using the following statements

```
System.Console.WriteLine()
```

(5 marks)

**Question 4**

- (a) Using inheritance concept in Object Oriented Programming techniques, write a class definition of a base class, `University` and derive a class `staff` from it. In `University` class, create a protected string member, `idstaff` and a public method `Show()` that display a text message "HIGH PERFORMACE CULTURE". In `staff`, the constructor should set the `idstaff` as "MFI 0001". In the `Display()` method, call `Show()` on the class, `University`.

(12 marks)

- (b) Write a class implementation that uses `Console Application` to instantiate `staffX` object of `staff` class to test the program.

(4 marks)

- (c) Modify Question 4 (a) to illustrates a polymorphic method and create a class implementation to test the program. Use `Overridable` and `Overrides` keywords

(4 marks)

**Question 5**

You are required to write an Object Oriented Program that uses Windows Application to calculate the electrical resistance of a wire. The program will requests user to input resistivity, area and length. The expected output should display the resistance of the wire result. Given the resistance formula as shown below:

$$\text{resistance} = (\text{resistivity} * \text{length}) / \text{area}$$

The answer should consists of

- (a) The Resistance class definition; identify the class state and class methods (class constructor, class property and a function method) (9 marks)
- (b) Form design interface (GUI sketch) that enable user to interact visually with a program. (Identify the name of common control use and properties name for each common control) (5 marks)
- (c) The Resistance class implementation (write a code of class implementation to test the program). You can use the following segment of code to test this program.

```
Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button1.Click
```

(6 marks)

**Question 6**

Write an Object Oriented Program that uses Console Application to compute new velocity and acceleration for an aircraft after a change in the power level. Given the following formula;

$$\text{Velocity} = 0.0001 \text{ time}^3 - 0.00488 \text{ time}^2 + 0.75795 \text{ time} + 181.3566$$

$$\text{Acceleration} = 3 - 0.000062 \text{ velocity}^2$$

The answer should define `Velocity` class with one class variables, `time` and create two constructors (default constructor and constructor with one parameter), class property and two functions method that will return the velocity and acceleration. Then, write a code of class implementation to test this program.

(20 marks)

**END OF QUESTION**