



**THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE**

**(A Constituent College of JKUAT)**

(A Centre of Excellence)

# **Faculty of Engineering & Technology**

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

**UNIVERSITY EXAMINATION FOR BACHELOR OF TECHNOLOGY IN  
INFORMATION TECHNOLOGY (BTIT/MAY2011/S-EV)**

EIT 4305: ADVANCED OBJECT ORIENTED PROGRAMMING

**SPECIAL/SUPPLEMENTARY EXAMINATION**

**SERIES: OCTOBER 2012**

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*

This paper consist of **FIVE** questions in **TWO** sections **A & B**

Answer question **ONE (COMPULSORY)** from section **A** and any other **TWO** from section **B**

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

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**SECTION A (COMPULSORY)**

**Question 1 (30 marks)**

- (a) Define the term layout manager and briefly explain the how each of the following layout managers arrange GUI components:
- (i) FlowLayout
  - (ii) BorderLayout
  - (iii) BoxLayout (4 marks)
- (b)
- (i) What does the acronym API stand for? Give.
  - (ii) In which Java API are all standard stream objects defined? Give.
  - (iii) In which Java API is the JFrame class defined? Give. (4 marks)
- (c)
- (i) What is a wrapper class? Explain.

- (ii.) Using the wrapper class Double write a method that reads and returns a float value. Assume you are writing this method in an application class.

**(5 marks)**

- (d.) With the aid of an example distinguish between the following:

- (i.) An overloaded and overridden method.  
(ii.) Class method and an instance method.

**(4 marks)**

- (e.) Write a Java console application class to simulate a bank ATM cash point machine. The program should display the following menu options to a user:

ATM Menu

1. Withdraw Cash
2. Check Balance
3. Order Statement
4. Exit System

Please enter a number for a selection >>

When a user selects an option (1 - 3) the program should call an associated method that displays an appropriate message showing that the method has been called correctly. After that the program should then return to the menu and allow another selection to be made. All methods corresponding to the menu options 1 – 3 should all be void. The program should terminate when option 4 is selected.

**(13 marks)**

### **Question 2 (20 marks)**

- (a.) A constructor is a very special method in a class definition. Briefly explain what we mean by the term constructor and give the distinguishing features that differentiate it from other member methods. **(5 marks)**
- (b.) (i.) What is a default constructor? Explain and give the general syntax for defining a default constructor.  
(ii.) How is a default constructor different from a parameterized constructor? Explain. **(4 marks)**
- (c.) How do we call the constructor of a parent class when defining the constructor of a child class? Give the operator and hence its syntax of usage. **(2 marks)**
- (d.) What does the term polymorphism mean? Explain. How can we achieve polymorphism in inheritance? Explain. **(3 marks)**
- (e.) Briefly explain how accessibility of a member element in a parent class affects the inheritance of the element in a child a class. **(6 marks)**

### **Question 3 (20 marks)**

- (a.) Briefly explain the each of following Java keywords:  
(i.) super  
(ii.) extends  
(iii.) new **(3 marks)**
- (b.) Define the term binding. Briefly distinguish static binding and dynamic binding. Which method does Java use in binding its methods? Give. **(4 marks)**

(c.) A class called Vehicle is required. An object of the class Vehicle will consist of the following data attributes:

- a registration number of type string
- the make of the vehicle of type string
- the year of manufacture of type integer and
- the current value of the vehicle of type float.

A constructor is required which will accept three arguments (parameters) to assign the first three attributes. Then write two accessor methods that will be used to set and get the current value of the vehicle. Then write three get accessor methods for other three data attributes. In addition a method (call it vehAge) is needed which accepts as an argument a year and returns the age of the vehicle.

Write a child class of Vehicle called SecondHandVehicle, this has an additional attribute, numberOwners, which needs to be initialized at the time of creation and read access is also required. An additional method (call it repOwners) is required which returns as a string a message telling us whether the vehicle has had more than one previous owner. **(13 marks)**

#### **Question 4 (20 marks)**

Create a problem domain class called 'Person' that contains the following instance variables:

- surname of the type string
- othernames of the type string
- age of the type integer
- marital\_status of the type string
- gender of the boolean

The instance variable marital status can take three values namely: Single, Married and Divorced. The instance variable marital\_status is of the type boolean and hence can take the values true or false, in our case these two values will represent the gender of the person either female or male, hence true will represent female and false will represent male.

The class will also include two parameterized constructors as follows:

- The first constructor should accept five parameter values, each corresponding to the named instance variable above. Each parameter value should be used to initialize its corresponding instance variable in the class.
- The second constructor should accept four parameter values corresponding to the surname, othernames, age and gender instance variables. Each parameter value should be used to initialize its corresponding instance variable in the class. In this constructor the instance variable marital\_status should be assigned the value Single.  
For each instance variable, the class should define a set and a get accessor method, hence you should define ten(10) accessor methods in this class.

Then you should also define a custom method called getMarried that will accept one string parameter value. This method will be of the return type void and should change the marital\_status of a person object to Married and check if the gender of the person getting married is Female, then change the surname instance variable of that person object to the string parameter value passed.

Using the problem domain class written above, write an application class that will create two objects called thomas and mary using the second constructor for both, the tom object is a male object while the mary object is female object. Then program should display the details of each person object. Using the object mary call the method getMarried and pass the surname of the object thomas, then after that display the details of the person object mary. **(20 marks)**