CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COMP 404: OBJECT ORIENTED PROGRAMMING (JAVA)

STREAMS: **TIME: 2 HOURS**

DAY/DATE: TUESDAY 5/12/2017 **8.30 A.M – 10.30 A.M**

INSTRUCTIONS:

Question one : (30 marks)

a. All methods in Java are dynamic polymorphic as a design choice. Discuss the advantages and disadvantages of making dynamic polymorphismoptionalforJava methods. [6marks]

b. When working with Primitive Data, you can assign a lower precision to a higher precision because Java will implicitly cast. Explain. [4marks]

c. If an attribute is private in a class, that class must provide mechanism for handling the private attributes. Discuss. [4marks]

d. How does java know that an object is no longer needed. What happens to that object. Use sketches to illustrate your answer? [4marks]

e. With use of illustrations, describes the concept of polymorphism [6marks]

f. Using example Java code, distinguish between overloading, overriding and shadowing and show how they are used in Java. [6marks]

SECTION B: CHOOSE ANY TWO QUESTIONS

QUESTION TWO:

a. With use of examples, explain the purpose of access modifiers in OOP languages. [8 marks]

b. Differentiate between encapsulation and abstraction [4marks]

c. Explain the different forms of polymorphism. [8marks]

QUESTION THREE 20 MKS

For each of the following pairs of concepts that are used in Java explain similarities and differences and discuss when you would use one rather than the other. If there are important syntactic differences, method names, degrees of generalization possible or the like, then any code fragments you give in illustration should be as short as possible to make the desired point.

(a) JApplet and simple Java applications [4 marks]

(b) Vector<String> and arrays of strings (String []) [4 marks]

(c) class, abstract class and interface [12 marks]

QUESTION FOUR 20 MKS

A palindromic word is one that reads the same backwards as forwards. Hence the words hello and peel are not palindromes, but the words peep, deed, racecar, and aibohphobia (fear of palindromes) are palindromes.

a) Create a class called Palindrome and define its constructor. [4 marks]

b) In your Palindrome class, create a method calledreverse() which takes a string argument. Your method should return the reverse of the argument as a string. For example, if the argument is _Foobar_ then your method should return _rabooF_. [8 marks]

c) Create a second method in Palindrome called is Palindrome() which takes a string argument. This method should return **True** if the argument is a palindrome and **False** otherwise. [8 marks]

QUESTION 5 20 MKS

1. Consider the following code in Object Oriented Programming. it defines the start of a class to represent bank accounts:

```
Public class BankAccount{

Intinterest_rate = 0.3
Public BankAccount(String name, int number, double balance):
this.name = name;
this.number = number;
this.balance = balance;

return 0;
```

a) Add instance methods calleddeposit() and withdraw() which increase and decrease the balance of the account. Make sure thewithdraw() method doesn't allow the account to go into overdraft. Add a third method called add interest() which adds interest to the balance (the interest should be the interest rate multiplied by the current balance). **[10 marks]**

b) Create a subclass of Bank Account called Student Account. Every Student Account should have an overdraft limit of Kshs 1000. Write a constructor for the new class. Override the withdraw() method to make sure that students can withdraw money up to their overdraft limits. **[10 marks]**