

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF COMMERCE

BCOM 270: COMPUTER PROGRAMMING

STREAM: BCOM Y2S1

TIME: 2 HOURS

DAY/DATE: MONDAY 12/8/2013

2.30 P.M – 4.30 P.M.

INSTRUCTIONS:

- i. Answer **QUESTION 1** in section A and any other **TWO QUESTIONS** from section B.
- ii. This is a **CLOSED BOOK EXAM**, No reference materials allowed in examination room. Make sure such materials are not found anywhere near your sitting.
- iii. No use of mobile phones, no electronic calculators, no memory watches.
- iv. Do not write on this Question Paper; Use your answer booklet for all your works.
- v. Write your answers **legibly** and use your time wisely.

SECTION A: COMPULSORY

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

```
Class Bank Account(object):  
interest rate = 0.3  
def __init__(self, name, number, balance):  
self.name = name  
self. number = number  
self. Balance = balance  
return
```

- (a) Name all the class variables and the instance variables in the given code. **[10 marks]**
- (b) Add instance methods called deposit () and withdraw () which increase and decrease the balance of the account. Make sure the withdraw () 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]**
- (c) Create a subclass of Bank Account called Student Account. Every Student Account should have an overdraft limit of 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]**

SECTION B: ANSWER ONLY TWO QUESTIONS FROM THIS SECTION

QUESTION 2[MARKS 20MKS]

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 and dad are palindromes.

- (a) Create a class called Palindrome. **[2 marks]**
- (b) In your Palindrome class, create a method called reverse () 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. **[10 marks]**

HINT: Probably the easiest way to do this is to use the result of your reverse () method and compare the string against its reverse.

- (d) Write some code to test your new Palindrome class and print out results of your testing to the user. Give some consideration to what sort of strings you might want to use for your testing. **[10 marks]**

QUESTION 3 [20MKS]

By use of control constructs, demonstrates how the following would be achieved.

(a) A program to sum the number of integers from 1 to a given number n. [4 marks]

(b) A program which sums the contents of a integer list or array. [4 marks]

(c) Translate the following for loop into a while loop (which does the same thing as the for loop):

```
for i in range(1,10):  
    print "i = ", i
```

 [8 marks]

(d) Translate the following while loop into a for loop (which does the same thing as the while loop):

```
i = 20  
while (i > 0):  
    print "i = ", i  
    i =- 1
```

 [4 marks]

QUESTION 4 [20 MARKS]

(a) What differentiates a function from a procedure? Illustrate. [4 marks]

(b) Explain how a function or a procedure simplifies the task of programming. [6 marks]

(c) Write a program that uses a function to calculate the area of a circle. [10 marks]

QUESTION 5 [20 MARKS]

(a) What is a recursive function? [2 marks]

(b) The following iterative function returns the sum of all elements in a list. For example, given the list [1, 2, 3] the function will return 1 + 2 + 3 or 6. Re-write the function as a recursive function.

```
def sum(arg):  
    result = 0  
    for i in arg:  
        result += i  
    return result
```

 [10 marks]

- c) The following code implements a recursive function in Python called foobar. What does the foobar function do? Write a line of code which calls the foobar function with a suitable argument and state what the return value will be.

```
def foobar(arg):  
    if arg == []:  
        return arg  
    else:  
        return foobar(arg[1:]) + [ arg[0] ]
```

[8 marks]
