



TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY
DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY
(DICT 13J)

ECS 2105: OBJECT ORIENTED PROGRAMMING

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2013
TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Attempt question **ONE** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One (Compulsory)

a) Explain the following terms:

- (i) Class
- (ii) Object
- (iii) Inheritance
- (iv) Polymorphism (8 marks)

b) State any SIX benefits of object orient programming (6 marks)

c) Using a suitable example, illustrate the declaration and implementation of a class (4 marks)

d) Explain the term 'Data Encapsulation' (2 marks)

Question Two

a) Distinguish between constructs and destructors (4 marks)

b) Explain 'function over loading' sate an example. (6 marks)

c) Write a program that use a class with 3 data members student ID, student mark and grade. The class also has 2 member functions Get Marks and showgrade. The function getmark gets values for studId and stud-mark. The function getmark also computes the value of grade. The grade is calculated as follows:

Stud-mark	Grade
0 – 39	F
40 – 49	D
50 – 59	C
60 – 69	B
70 – 100	A

The function show grade displays the student Id mark and grade. (10 marks)

Question Three

a) Using suitable examples, explain multiple inheritance (4 marks)

b) Student and employees are subclasses of person. The properties of person are First Name, Last Name, age, Id, Address, Gender

The properties of employees include all the properties of person and extra properties such as Department, Job Group, House allowance, Basic pay and medial allowance. The employee class also contains function to calculate total pay. The student class inherits all the properties of person and has the following extra properties. course code, department and grade.

Declare the person, Employee and student subclasses (10 marks)

- c) Write a C++ program to read 50 integers and return the number of odd number and even numbers read.

Question Four

- a) Describe THREE ways in which a class can inherit from other class explain how the access specifiers may change. **(10 marks)**

- b) Explain “friend function” **(2 marks)**

- c) A class called “Example” has been defined as shown below”

```
#include <iostream>
```

```
#include <string>
```

```
name space std;
```

```
class example
```

```
{int a, b, d;
```

```
public;
```

```
void set values (int A, int B int D
```

```
{a = A, b = B, d = D;
```

```
}
```

```
};// end of class
```

Re-write the class “Example” so that it contain a friend function called “calculate” which computes $2*a + (b +c)$ **(2 marks)**

Also show how the class can be implemented in the main () function

(8 marks)

Question Five

- a) A class called “Employee” has been defined. Explain the steps you would take so that the class employee is placed in separate file from the main program. **(10 marks)**

- b) Using suitable example, describe different ways in which user defined header files can be used in a C++ program. **(6 marks)**

- c) Explain why a class can contain more than one construct or but only one destructor in a class.

(4 marks)