



**KENYATTA UNIVERSITY**  
**UNIVERSITY EXAMINATIONS 2011/2012**  
**SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE**  
**(MECHANICAL ENGINEERING)**  
**EMM 309: COMPUTER PROGRAMMING II**

**DATE:** Monday 16<sup>th</sup> April, 2012

**TIME:** 11.00 a.m. – 1.00 p.m.

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**INSTRUCTIONS:** *Answer question ONE and any other TWO questions.*

**Question 1[COMPULSORY]**

- (a) Discuss any four benefits of Object Oriented Programming [4 Marks]
- (b) Briefly discuss the main features of the following functions
  - (i) Constructor
  - (ii) Friend function
  - (iii) Destructor
  - (iv) Inline function[6 marks]
- (c) Discuss using example how division by zero error can be handled in a program. [8 marks]
- (d) What is persistent data? Demonstrate using program how this can be achieved. [6 marks]
- (e) What is a template function? Discuss its use in programming [6 Marks]

**Question 2**

- (a) Discuss role of the following access modifiers as used during inheritance
  - i. Protected
  - ii. Public
  - iii. Private[6 marks]
- (b) Give 3 advantages of data structures [3 marks]
- (c) Define what you understand by Multiple inheritance giving examples [3 marks]
- (d) Define a class called person with the members age, firstname and lastname and two member methods getValues and setValues as well as a constructor to initialise all the class data members [4 marks]
- (e) Define a class Student that inherits the Person class but adds member variables institution, year (year of study) and registration number. [4 marks]

**Question 3**

- (a) Briefly discuss types of Polymorphism [6 marks]
- (b) List two importance of polymorphism in OOP [2 marks]
- (c) With an example explain function overloading [4 marks]
- (d) With an example explain operator overloading [4 marks]
- (e) Discuss role played by standard template library in program development [4 marks]

#### Question 4

- (a) State three characteristics of Objects and their significance in OOP Program [6 marks]
- (b) Differentiate between the following
- i.) Object and a class
  - ii.) Method call and message passing
  - iii.) Method overloading and method overriding [6 marks]
- (c) Discuss the following and state how they are used to achieve data hiding and abstraction
- i.) Private
  - ii.) Protected [6 marks]
- (d) Create a class animal with one data member; animal type and a constructor and show how you can create an object of this type [2 marks]

#### Question 5

- (a) Study the following program and answer the question that follow

```
#include <iostream.h>
class Date {
    private:
        int day;
        int mon;
    public:
        void display (void) {cout<<day<<"/" << mon<<endl;}
        void setDate (int m, int d) {mon = m; day=d;}
        int get_month (void) {return mon;}
        int get_day (void) {return day;}
};
main()
{
    Date hiredate;
    hiredate.setDate(2,24);
    hiredate.display();
    /*
    hiredate.mon = 10; // error
    hiredate.day = 1;    //      error
    */

    cout <<"hire date month is"<< hiredate.get_month()
        <<"\nhire date day is"<<hiredate.get_day()
        << endl;
}
```

- i) The multi line comment indicate an error.  
Explain why the system would report that error [2 marks]
- ii) Predict the output generated once the error containing statements are removed [3 marks]
- (b) Define the term default constructor [4 marks]
- (c) Define an ART class that allows an art museum to keep track of its collection. Use a header file (art.h) for the class definition, and separate source files for the class member function implementation (art.cpp). [11 marks]