

UNIVERSITY EXAMINATIONS

2019/2020 ACADEMIC YEAR

REGULAR EXAMINATION

**FOR THE DEGREE OF
BACHELOR OF SCIENCE**

IN

COMPUTER SCIENCE

BACHELOR OF SCIENCE IN EDUCATION

COURSE CODE:

COM 213/COM 413

COURSE TITLE:

**OBJECT ORIENTED
PROGRAMMING**

DATE: 6TH DECEMBER, 2019

TIME: 9.00 AM - 12.00 NOON

UNIVERSITY OF ELDORET

University Examinations 2019/2020

**YEAR TWO, FOUR SEMESTER ONE EXAMINATIONS
FOR THE DEGREES OF**

- **BACHELOR OF SCIENCE IN COMPUTER SCIENCE**
- **BACHELOR OF SCIENCE IN EDUCATION**

**COM 213: OBJECT ORIENTED PROGRAMMING
COM 413: OBJECT ORIENTED PROGRAMMING**

DATE: DECEMBER 2019

TIME: 3 HOURS

**Instructions: Answer all questions from section A and any
other three questions from section B.**

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this paper*

SECTION A: ATTEMPT ALL QUESTIONS FROM THIS SECTION

Question 1 (12 Marks)

Question 2 (12 Marks)

SECTION B: ATTEMPT ANY THREE QUESTIONS FROM THIS SECTION

Question 3 (12 Marks)

- (a) Describe how we declare a pointer of a class, and use it to call member functions. Use sample code. **(6 Marks)**

(b) Describe how we declare an array of objects of a class and access members using a loop. Use sample code. **(6 Marks)**

Question 4 (12 Marks)

The details that concern a student are the student's registration number, name, and fee amount paid. The operations done on a student include registering a new student, outputting a student's details and paying fees (increment with the existing fee).

Required: Write a program in C++ to implement this for 20 students. Define the member functions outside the class, and have pointers calling the functions.

(12 Marks)

Question 5 (12 Marks)

(a) Explain how the feature of inheritance saves time during program development. **(2 Marks)**

(b) Consider the following definition of three classes in C++.

```
class one
{
private:
    int oneA;
protected:
    int oneB;
public:
    int oneC;
};

class two: public one
{};

class three: private one
{
protected:
    int threeA;
};
```

Required: Write down the members of classes **two** and **three** (including the inherited members) as well as their visibility levels. **(4 Marks)**

(c) There are various forms of inheritance. What form is sketched below?

(i) class k
{};
class n
{};
class m: public k, n
{};

(ii) class k
{};
class n: public k
{};
class m: public k
{};

```
(iii) class k  
{};  
class n: public k  
{};  
class m: public n  
{};
```

(6 Marks)

Question 6 (12 Marks)

- (a) Explain the importance of using destructors in programming. **(2 Marks)**
- (b) (i) Give any four rules for a valid constructor in C++. **(4 Marks)**
- (ii) Consider the following program.

```
#include <iostream.h>  
class k  
{    float code; };  
  
void main()  
{}
```

Required: Rewrite the program to illustrate the usage of the following: A copy constructor and a function to input the value of **code**. The two functions should be defined outside the class. Also, create objects such as to invoke the methods. **(6 Marks)**

Question 7 (12 Marks)

The details stored for a book in a shop are the unique item code, name, price, as well as the stock, the author, the edition, the publisher and the year of publication. The details stored for an electronic item are unique item code, name, price, the stock, and the discount rate. The operations done on the items include registering a new item, outputting details of an item, selling an item (update stock appropriately), and computing the discount given (for electronics).

Required: Write down definitions of classes using polymorphism for the above. **(12 Marks)**

member functions - used to access data members (private) indirectly



UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

REGULAR EXAMINATION

FOR THE DEGREE OF

BACHELOR OF SCIENCE IN COMPUTER SCIENCE;
INFORMATION SCIENCE; APPLIED STATISTICS;
ANALYTICAL CHEMISTRY & BACHELOR OF SCIENCE
WITH EDUCATION

COURSE CODE:

COMP 213

COURSE TITLE:

OBJECT ORIENTED
PROGRAMMING

DATE: 3RD DECEMBER, 2021

TIME: 8.00 AM - 11.00 AM

INSTRUCTIONS TO CANDIDATES

- Answer all questions from section A and any other three questions from section B.

THIS PAPER CONSISTS OF (5) PRINTED PAGES. PLEASE TURN OVER

SECTION A: ATTEMPT ALL QUESTIONS FROM THIS SECTION

Question 1 (12 Marks)

Question 2 (12 Marks)

SECTION B: ATTEMPT ANY THREE QUESTIONS FROM THIS SECTION

Question 3 (12 Marks)

- (a) A student wrote the following program which is meant to input a positive integer x , and then output the sequence 1 2 3 ... x using a while loop. However, it has some errors. Give five programming errors with the program (State the line number and the error). **(5 Marks)**

```
#include <iostream>
using namespace std
/* main function */
int main()
{
    int c, x;
    cout<<"\nInput a positive integer", cin>>x;
    if (x<=0);
        cout<<"\nNegative integer not allowed";
    Else
    {
        c=1;
        while (c<=x)
            cout<<c;
        c++;
    }
}
```

- (b) (i) Write a class named **myclass** with a data member name **value** (a string). The class should also have prototypes of the following member functions which should also be defined outside the class;
- **assign()** that receives a string and assigns it to the data member.
 - **get_value()** that returns the value of the data member. **(5 Marks)**
- (ii) Write sample brief code to declare objects of the immediate above class and invoke the two operations appropriately. **(2 Marks)**

Question 4 (12 Marks)

- (a) Explain the importance of using destructors in programming. **(2 Marks)**
- (b) (i) Give any four rules for a valid constructor in C++. **(4 Marks)**

(ii) Consider the following program.

```
#include <iostream.h>
class k
{    float code; }
void main()
{ }
```

Required: Rewrite the program to illustrate the usage of the following: A copy constructor and a function to input the value of **code**. The two functions should be defined outside the class. Also, create objects such as to invoke the methods. **(6 Marks)**

Question 5 (12 Marks)

An employee in a particular sales company is either full time or part time. Full time employees are grouped into two - administrators and salesmen.

Details stored for a full time employee include a unique employee code, the employee's name and his/her contacts, salary, title, total sales made in the month (only for salesmen), and the job group (only for administrators). The operations performed here include registering a new employee, and computing the net salary (Tax is 20% of salary, allowances is 30% of salary plus a sales commission of 5 % (only for salesmen)).

Details stored for a part time employee include a unique employee's code, his/her name and contacts, title, and the employee's hourly pay rate. The operations performed on a part time employee include registering a new employee, and computing the monthly income (input total hours worked).

Required: Write down definitions of classes using inheritance to implement the above. **(12 Marks)**

Question 6 (12 Marks)

- (a) (i) Define the three types of polymorphism. **(3 Marks)**
- (ii) Explain the rules governing the use of a pointer to access members of the base class and the derived class. **(3 Marks)**
- (iii) Write down the output of the following program. **(3 Marks)**

```
#include <iostream>
using namespace std;

class classX
{
public:
    void a()      { cout<<"\n a of classX"; }
```

```

        virtual void b(){ cout<<"\nb of classX"; }
};

class classY: public classX
{
public:
    void a() { cout<<"\na of classy"; }
    void b() { cout<<"\nb of classy"; }
};

void main()
{   classX x;   classY y;   classX *p;
    p=&x; p->a(); p->b();
    p=&y; p->a(); p->b();
}

```

- (b) Explain two major errors with the following program.

(3 Marks)

```

#include <iostream>
using namespace std;
class A
{
public:
    virtual void display()=0;
};
class B: public A
{
public:
};
void main()
{
    A a;
    a.display();
    B b;
    b.display();
}

```

Question 7 (12 Marks)

The details stored for a book in a shop are the unique item code, name, price, as well as the stock, the author, the edition, the publisher and the year of publication. The details stored for an electronic item are unique item code, name, price, the stock, and the discount rate. The operations done on the items include registering a new item, outputting details of an item, selling an item (update stock appropriately), and computing the discount given (for electronics).

Required: Write down definitions of classes using polymorphism for the above.
(12 Marks)