Rwanda National Chemistry II S6 Collection (2003 - 2023)

BIOLOGY-CHEMISTRY-GEOGRAPHY (BCG)

- MATHEMATICS-CHEMISTRY-BIOLOGY (MCB)

- PHYSICS-CHEMISTRY-BIOLOGY (PCB)

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COMPUTER SCIENCE

016

31/07/2023 8:30 AM- 11:30 AM

NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2022-2023

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- MATHEMATICS-COMPUTER SCIENCE-ECONOMICS **(MCE)**
- MATHEMATICS-PHYSICS-COMPUTER SCIENCE **(MPC)**

DURATION: 3 HOURS

INSTRUCTIONS:

1) Write your names and index number on the answer booklet as written on your registration form, and **DO NOT** write your names and index number on additional answer sheets if provided.
2) Do not open this question paper until you are told to do so.
3) This paper consists of **THREE** sections: **A, B** and **C.**
   Section A: Attempt **ALL** questions**.** **(55 marks)**
   Section B: Attempt any **THREE** questions. **(30 marks)**
   Section C: Attempt any **ONE** question. **(15 marks)**
4) Use only a **blue** or **black** pen.

SECTION A: ATTEMPT ALL QUESTIONS. (55 marks)

1) What are the four classifications of computers based on their size? **(4 marks)**
2) Differentiate between hardware and software failure. **(4 marks)**
3) Write pseudocode to check whether a given number is positive, negative or zero. **(6 marks)**
4) Explain the role of computer graphic in Education and training. **(4 marks)**
5) Explain disk formatting in terms of computer. **(4 marks)**
6) Is C++ case sensitive? What is meant by the term "case sensitive"? **(4 marks)**
7) Outline any two advantages and disadvantages of FDDI within a Local Area Network. **(4 marks)**
8) A-member function of a class can be defined inside the class or outside of class. Provide the syntax which demonstrates how to define the member function outside of class? **(5 marks)**
9) After studying Java, you are requested to make a proposal of Enterprise web Application for your school, explain the process to create that website and test. **(5 marks)**
10) What is the difference between assignment operator and equality operator? **(4 marks)**
11) Java is a "platform-independent language." What does this mean? **(3 marks)**
12) Can a class extend itself? Explain your answer. **(3 marks)**
13) Describe the characteristics of Secondary Memory. **(5 marks)**

SECTION B: ATTEMPT ANY THREE QUESTIONS. (30 marks)

14) Write C++ programs to interchange the values of two variables without using a third variable. **(10 marks)**
15) Compare a peer to peer network and a client server network. **(10 marks)**
16) Write a vb program to display the following patterns on the label control placed on the form (both vb6.0 and vb.net are allowed, use one you want) **(10 marks)**

```
*
**
***
****
*****
```

17) Develop the program below using bufferedReader method. **(10 marks)**

```
package javaapplication17;
import java.util.Scanner;
public class JavaApplication17 {

    public static void main(String[] args) {
int k,ss,m,largest;
Scanner s=new Scanner(System.in);
System.out.println("Enter age of student K: ");
 k=s.nextInt();
System.out.println("Enter age of student SS: ");
ss=s.nextInt();
System.out.println("Enter age of Student M: ");
m=s.nextInt();
if (k<ss && k<m)
{ System.out.println("youngest is K with : "+k +"age(s)"); }
else if (ss<k && ss<m)
{ System.out.println("youngest is SS with: "+ss +"age(s)"); }
 else if  (m<k && m<ss)
{ System.out.println("youngest is M with: "+m +"age(s)"); }
else
 System.out.println(" both or 2 among K, SS and M are in the same
age" );

    }
    }
```

18) A database of an employee is identified by EmpId, FirstName, Surname, Address and Birthdate while a project is identified by its ProjectId and ProjectName. Draw a diagram representing the Entity Relationship. **(10 marks)**

SECTION C: ATTEMPT ANY ONE QUESTION. (15 marks)

19) (a)Create a table of your choice with at least 4 different attributes in SQL. **(15 marks)**

(b)Given an "Employee" table below:

NAME	PHONE	ADDRESS	SALARY	EVALUATION
KANAMUGIRE	08564433	KACYIRU	185000	0.75
RURANGWA	51231578	NYAMATA	123000	0.90
BAHIZI	03314563	RWAMAGANA	230000	0.80
GIRANEZA	08567838	REMERA	197000	0.85

Write SQL statements for:

i. Insert the new employee into the table.
ii. Update the table to give a salary increase of 20% to those employees whose evaluation is above or equal to 0.80.
iii. Destroying table name "Empoyee."
iv. List the names, salary and address of employees whose evaluation are less than 0.8 or greater than 0.85. (0.8 and 0.85 are not included)

20) Using a pointer, write a C++ program that will display an area and volume of a sphere (area=$4\pi r^2$, volume=$\frac{4}{3}\pi\ r^3$). **(15 marks)**

-END-

COMPUTER SCIENCE

016

01/08/2022 8:30 AM- 11:30 AM

NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2021-2022

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- MATHS-COMPUTER SCIENCE-ECONOMICS **(MCE)**
- MATHS-PHYSICS-COMPUTER SCIENCE **(MPC)**

DURATION: 3 HOURS

INSTRUCTIONS:

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   Section B: Attempt **THREE** questions. **(30 marks)**
   Section C: Attempt any **ONE** question. **(15 marks)**
4) Use only a **blue** or **black** pen.

SECTION A: ATTEMPT ALL QUESTIONS. (55 marks)

1) List the main characteristics of a computer. **(5 marks)**

2) Describe the differences between keywords and identifiers, and give an example. **(5 marks)**

3) What are the various formatting tags in HTML? Explain each. **(6 marks)**

4) Determine the output of the following program **(6 marks)**

```
#include <iostream>

using namespace std;

int main()

{ int n=44;

int& rn=n;

cout << "n = " << n << ", rn = " << rn << endl;

--n;

cout << "n = " << n << ", rn = " << rn << endl;

rn *= 2;

cout << "n = " << n << ", rn = " << rn << endl;

}
```

5) Illustrate some advantages of servlets. **(4 marks)**

6) Using if...else if statement, write the corresponding codes of the following program codes (suppose that they are embedded in vb6.0 or vb.net) **(6 marks)**

```
Dim Age As Integer
Age = Text1.Text

Select Case Age
Case 5
 lblCategory.caption = "Child of Five Years Old"
Case 13 To 19
lblCategory.caption = "Teenager"
Case 20 To 35, 50, 60 To 65
 lblCategory.caption = "Special Adult"
Case Is > 65
 lblCategory.caption = "Senior Citizen"
Case Else
 lblCategory.caption = "Everyone Else"
    End Select
```

7) Outline any four devices where Java can be used. **(2 marks)**

8) Analyze the program below and answer the questions that follow. **(5 marks)**

```
class district {
int num;
String name;
district()    {
 System.out.println("Rwanda has 30 districts ");  }}

public class Learningactivity102 {
public static void main(String[] args) {
            district district1 = new district();
System.out.println(district1.name);
System.out.println(district1.num);  }  }
```

a) What is the output of the above program?
b) Differentiate between district, district1 and district () used in above program.

9) Differentiate RDB from RDBMS. **(4 marks)**

10) Define the following terms used in computer security **(4 marks)**
a) Computer security
b) Threat

11) What are the advantages of protecting your wireless network with a password? **(3 marks)**

12) What does the term bandwidth mean? Give an example. **(3 marks)**

13) List four areas where computer graphics can be applied. **(2 marks)**

SECTION B: ATTEMPT THREE QUESTIONS. (30 marks)

14) Elaborate responsibilities and role of technician in computer repairing. **(10 marks)**

15) Draw a flowchart to find the largest among three different numbers entered by user. **(10 marks)**

16) Using array write a java program to calculate sum and average of n numbers. **(10 marks)**

17) Study the table below and answer the queries that follow. **(10 marks)**

ACCOUNT

CustomerID	AccountNumber	AccountType	DateOpened	Balance
1001	9987	Checking	10/12/1989	4000.00
1001	9980	Savings	10/12/1989	2000.00
1002	8811	Savings	01/05/1992	1000.00
1003	4422	Checking	12/01/1994	6000.00
1003	4433	Savings	12/01/1994	9000.00
1004	3322	Savings	08/22/1994	500.000
1004	1122	Checking	11/13/1988	800.000

CUSTOMER

CustomerID	Names	Address	City	State	Zip
1001	Smith	123 Lexington	Smithville	KY	91232
1002	Jones	12 Davis Ave.	Smithville	KY	91232
1003	Axen	443 Grinder Ln.	Broadville	GA	81992
1004	Builder	661 Parker Rd.	Streetville	GA	81990

a) List all the details of customers. **(2 marks)**
b) List all the different account types. **(2 marks)**
c) Display all customers whose names contain the character "n". **(2 marks)**
d) Find the total savings of all customers. **(2 marks)**
e) What will be sql code for the following output? **(2 marks)**

CustomerID	AccountNumber	AccountType	DateOpened	Balance
1003	4422	Checking	12/01/1994	6000.00
1004	1122	Checking	11/13/1988	800.000

18) Write a VB program that displays the multiplication table of 4 to 6. (You can use vb6.0 or vb.net) **(10 marks)**

SECTION C: ATTEMPT ANY ONE QUESTION. (15 marks)

19) Create a class called employee that contains a name (an object of class string) and an employee number (type long). Include a member function called getdata() to get data from the user for insertion into the object, and another function called putdata() to display the data. Assume the name has no embedded blanks.

Using C++ Write a main() program to exercise this class. It should create an array of type employee, and then invite the user to input data for up to 100 employees. Finally, it should print out the data for all the employees. **(15 marks)**

20) Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, use *non-preemptive* scheduling and base all decisions on the information you have at the time the decision must be made.

(15 marks)

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

a) What is the *average turnaround time* for these processes with the FCFS scheduling algorithm? **(5 marks)**

b) What is the *average turnaround time* for these processes with the SJF scheduling algorithm? **(5 marks)**

c) The SJF algorithm is supposed to improve performance, but notice that we chose to run process P1 at time 0 because we did not know that two shorter processes would arrive soon. Compute what *the average turnaround time* will be if the CPU is left idle for the first 1 unit and then SJF scheduling is used. Remember that processes P1 and P2 are waiting during this idle time, so their waiting time may increase. This algorithm could be known as future-knowledge scheduling. **(5 marks)**

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COMPUTER SCIENCE

016

26/07/2021 8.30 AM- 11.30 AM

NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2020-2021

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- MATHS-COMPUTER SCIENCE-ECONOMICS **(MCE)**
- MATHS-PHYSICS-COMPUTER SCIENCE: **(MPC)**

DURATION: 3HOURS

INSTRUCTIONS:

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   Section B: Attempt **three** questions. **(30 marks)**
   Section C: Attempt **any one** question. **(15 marks)**
4. Use a **blue** or **black** pen.

SECTION A: ATTEMPT **ALL** QUESTIONS **(55 marks)**

1) What is the difference between a function and a sub (method) in VB? **(3 marks)**

2) Write an algorithm that asks the user to enter the max of students and if the max are between 9.5 and 10 add 1 max **(5 marks)**

3) Differentiate the Arithmetic operation from logic unit and give an example. **(4 marks)**

4) Explain the difference between a one-to-many and a many-to-many relationship. Give an example for each. **(4 marks)**

5) What is *pseudocode*? **(3 marks)**

6) What advantages does fiber optics have over other media? **(3 marks)**

7) Write the corresponding C++ expressions for the following mathematical expressions: **(3 marks)**
   (i) $\sqrt{(a^2+b^2)}$
   (ii) (ii) $(a+b)/(p+q)^2$

8) Write a VB program to display the following sequence of numbers 100,80,60,40,20,0 **(5 marks)**

9) Most PCs give a single beep on boot up to indicate they are ok hardware wise. You boot your PC and don't get a beep. What should you check first? **(2 marks)**

   A. System board

   B. Microprocessor

   C. Ram

   D. Power supply

   E. Speaker

10) Predict the output of the program below **(3 marks)**

```
class Shape{
public void display()
{
System.out.println("Inside display");
}
}
class Rectangle extends Shape {
public void area() {
System.out.println("Inside area");
}
}
class Cube extends Rectangle
{
public void volume()
{ System.out.println("Inside volume");
}
} public class Cartest {
public static void main(String[] args)
{
Cube cube = new Cube();
cube.display();
cube.area();
cube.volume();
}}
```

11) In a network that contains two servers and twenty workstations, where is the best place to install an Anti-virus program? Explain why. **(3 marks)**

12) What is the difference between if and if – else statement? Explain with suitable examples. **(4 marks)**

13) Describe the 3 Main parts of a computer with suitable examples. **(6 marks)**

14) Rewrite the following code using for loop: **(4 marks)**

```
int i = 0;
while(++i <20)
{
if(i = = 8)
break;
System.out.println(++i);
}
```

15) List three Softwares used in computer graphics. **(3 marks)**

SECTION B: ATTEMPT **THREE** QUESTIONS **(30 marks)**

16) Answer the following questions :

a) What do you understand by the term Equi-Join ? Give an example. **(3 marks)**

b) What do you understand by group functions of SQL ? Name any two group functions. **(3 marks)**

c) Differentiate between the COMMIT and ROLLBACK commands of SQL. **(2 marks)**

d) What is the difference between UNION and UNION ALL? **(2 marks)**

17) Write C++ program to print the following pattern: **(10 marks)**

```
   *
  **
 ***
****
****
```

18) Construct a class named Rectangle that has floating – point data members named length and width. The class should have a member method named perimeter (), and area() to calculate the perimeter and area of rectangle, a member method named getdata() to set a rectangle's length and width, and a member method named showdata() to display a rectangle's length, width perimeter and area. The perimeter and area are given by the following formula: **(10 marks)**

$$P = (L + W)/2$$

$$A = (L * P)/2)$$

19) a) Draw the OR Gate and its truth table **(4 marks)**

b) Find decimal equivalent of $(10011.1101)_2 = (?)_{10}$ **(2 marks)**

(i) Find binary equivalent of $(23)_{10} = (?)_2$ **(2 marks)**

(ii) Subtract $(101011)_2$ from $(1111111)_2$ **(2 marks)**

20) Write java program to check whether a given number is positive or negative. **(10 marks)**

SECTION C: ATTEMPT **ANY ONE** QUESTION **(15 MARKS)**

21) Design an application in visual basic to compute the commission earned by a sales man. The application should display the sales volume and the commission earned using the following conditions:

If Sales Volume is <500 Commissions rate is 2% of Sales volume

If Sales Volume is <1000 Commissions rate is 4% of Sales volume

If Sales Volume is <2000 Commissions rate is 6% of Sales volume

If Sales Volume is <5000 Commissions rate is 8% of Sales volume

If Sales Volume is >5000 Commissions rate is 10% of Sales volume

The program should display the name of the sales person in the label, and the commission earned in the text box. **(15 marks)**

22) The following table shows the details of employees in human resource unity, table named Employee **(15 marks)**

Employee ID	First name	Last name	Salary	Gender
1	Harerimana	Innocent	500000	gabo
2	Karemera	Rachidy	600000	gabo
3	Umuhoza	Mariam	550000	gore
4	Kayisinga	Hamed	300000	gabo
5	Mukamana	Jenniffer	320000	gore
6	Kamanayo	Odile	200000	gore
7	Umutoni	Manila	100000	gore

Answer the following questions from table Employee:

a) Write the query to get only "first name "column from Employee table. **(1 marks)**

b) Write a query to get First name in upper case as "First Name". **(1 marks)**

c) Write the query to combine first name and last name and display it as "Name" (also include white space between first name and last name). **(1 marks)**

d) Select Employee detail whose name is "Manila". **(1 marks)**

e) Get all employees from Employee table whose first name contain K.
(2 marks)

f) Get all employees from employee table whose "gender" ends with 're'.
(2 marks)

g) Get the highest salary and rename maximum from employee table. **(1 marks)**

h) Select all employees with first name except
(Umuhoza, Kayisinga, Umutoni). **(2 marks)**

i) List Employees whose salary is less than 500000 and
whose first names start with character "K". **(2 marks)**

j) Show Employee details whose salary is less than
or equal to 550000; consider gore only and show the salary in ascending order.
(2 marks)

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COMPUTER SCIENCE

016

18/11/2019 8:30 AM – 11:30 AM

Rwanda Education Board

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2019

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- **MATHS-COMPUTER SCIENCE-ECONOMICS (MCE)**
- **MATHS-PHYSICS-COMPUTER SCIENCE (MPC)**

DURATION: 3HOURS

INSTRUCTIONS:

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   SECTION C: Attempt any **ONE** question. **(15 marks)**
4) Use only a **blue** or **black** pen.

SECTION A: ATTEMPT ALL QUESTIONS. (55 marks)

1) Give the codes for movenext, moveprevious methods in the VB. **(2 marks)**

2) Explain the peer to peer network. **(3 marks)**

3) What are the principle problems to be handled by the operating system's memory management? **(3 marks)**

4) What are the work (operation) performed by the following audio port? **(4 marks)**

   Line In
   Microphone
   Line Out
   Gameport/MIDI

5) Rewrite the following code using switch statement: **(5 marks)**

```
If (k==1)
Day="Monday";
Elseif (k==2)
Day=" Tuesday";
elseif (k==3)
Day="Wednesday";
else
Day="-"
```

6) What is the main purpose of Photoshop? **(3 marks)**

7) Describe the four (4) roles of CPU **(4 marks)**

8) Why is Multimedia important in education? **(4 marks)**

9) Write an algorithm that asks the user to enter the number and it displays the square of that number. **(4 marks)**

10) Write the output of the following program and explain your answer. **(4 marks)**

```
int i;

float f = 3.14;

i = (int) f;

cout<<i;
```

11) a) What is a function ? **(2 marks)**

b) Write the syntax showing how the function is declared. **(4 marks)**

12) What is the difference between CLI vs GUI? **(3 marks)**

13) Describe the Characteristics of Constructors. **(4 marks)**

14) Describe the major components of a database management system. **(4 marks)**

15) What is the importance of Encapsulation? **(2 marks)**

SECTION B: ATTEMPT ONLY THREE QUESTIONS. (30 marks)

16) Write HTML code to print the following output: **(10 marks)**

Weekly days

Saturday

Sunday

Monday

Tuesday

Wednesday

Thursday

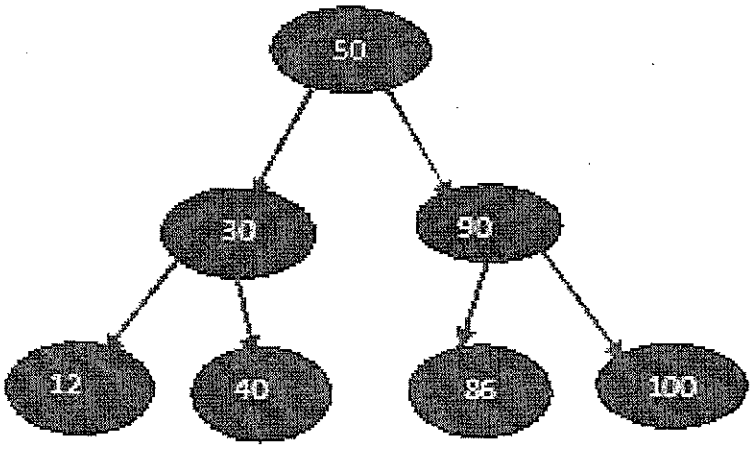
Friday

17) Write a C++ Program using array to find the average marks obtained by 5 students. **(10 marks)**

18) Write the Java Program to swap two Numbers entered from the keyboard. **(10 marks)**

19) Write codes of a VB 6.0 program which displays the sum and average of numbers ranging from 0 to 10 use do...loop until **(10 marks)**

20) a) Determine the order in which the elements would be accessed during an in-order, pre-order and post-order traversal. **(10 marks)**



b) Determine the Path between 50 and 86.

SECTION C: ATTEMPT ONLY ONE QUESTION (15marks)

21) Consider the following instances of the Student, Enrolment and Course relations from the University relational model.

Student

Reg No	Name	Reg year	CounsellorNo
s01	Kaberuka	1993	4523
s02	Smith	1998	3412
s05	Smitoth	1997	4523
s07	Smiteth	1996	4538
s09	Nsabimana	1995	4523

Enrolment

Reg No	CourseCode	TutorNo
s01	c4	4523
s05	c2	3412
s05	c7	3412
s07	c4	4538
s09	c4	4523
s09	c2	4538
s09	c7	4523

Course

CourseCode	Title	Credit
c2	C++ Programming	100
c4	Databases	100
c7	Logic	50

Using the University relational model, give relational algebra queries to discover the following:

a) Find the reg No name registered in year 1993,1995,1997or 1998. **(2 marks)**

b) Using SQL statement, display the names and Reg No of all students. **(2 marks)**

c) Display the names of all students registered since 1996. **(2 marks)**

d) Find the names of all students taking course 'c7'. **(2 marks)**

e) Specify Students whose Reg Year are less 1996 or greater than 1997 **(2 marks)**

f) Display Reg No of all students with the names of either 'Smith' or' Smitoth' **(2 marks)**

g) List the Reg No and names of Students with Reg year in the range 1995 to 1997 inclusive. **(3 marks)**

22) Explain the following network topologies:

Bus topology	**(3 marks)**
Ring topology	**(3 marks)**
Star topology	**(3 marks)**
Mesh topology	**(3 marks)**
Extended star topology	**(3 marks)**

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COMPUTER SCIENCE

016

26/11/2018 8.30 AM- 11.30 AM

Rwanda Education Board

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2018

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- MATHS-COMPUTER SCIENCE-ECONOMICS (MCE)
- MATHS-PHYSICS-COMPUTER SCIENCE (MPC)

DURATION: 3HOURS

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   Section C: Attempt **ONLY ONE** question. **(15 marks)**
4. Use only a **blue** or **black** pen.

SECTION A: ATTEMPT ALL QUESTIONS (55 Marks)

1) Give and explain the main components of an Operating System. **(3marks)**

2) Is it possible to Log on more than 1 user using one computer simultaneously? Explain your answer. **(3marks)**

3) Give 4 expansion cards available in the computer. **(4marks)**

4) What is int, float and char? **(3marks)**

5) Explain 3 Data Manipulation Language statements. **(3marks)**

6) (a) What is a protocol? **(2marks)**

(b) Give 5 main functions of the protocols. **(5marks)**

7) Describer the friend function. **(3marks)**

8) Convert the following in Decimal number. **(4marks)**

(a) $(1237)_8$

(b) (10101)2

9) Rewrite the following if-else segment using switch-case statement. **(4marks)**

```
char ch='A';
if(ch=='A')
System.out.println("Account");
if((ch=='C') || (ch=='G'))
System.out.println("Admin");
if(ch=='F')
System.out.println("Advisor");
```

10) What is meant by case sensitive? Is Java case sensitive? **(3marks)**

11) List any 3 objectives of a website. **(3marks)**

12) Give the syntax of declaring a structure. **(3marks)**

13) List the basic operations carried out in a linked list. **(4marks)**

14) What are the four functions of an operating system? **(4marks)**

15) What are the hardware devices used for computer graphics? **(4marks)**

SECTION B: ATTEMPT ANY THREE QUESTIONS (30Marks)

16) Compare the disadvantages of fiber optic cables and the advantages of twisted pair cables. **(10marks)**

17) (a) Name different ADO Objects. **(10marks)**

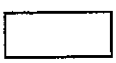
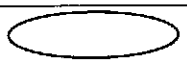
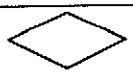
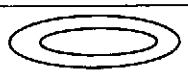
(b) What is the difference in passing values ByRef or ByVal to a procedure?

(c) What is the difference between list box and combo box?

18) Using a class, write a program to find the largest number in two number entered by the user. **(10marks)**

19) (a)Give at least five operators allowed in the WHERE Clause. **(10marks)**

(b)Complete the table below:

Notation chart	Corresponding meaning in ERD
	
	
	
	
	

20) Among 20 values given by a user, write an algorithm to display the values which are less than their average. **(10marks)**

SECTION C: ATTEMPT ANY ONE QUESTION (15 Marks)

21) Consider the following Entities and Relationships. **(15marks)**

Country (con-code,name,capital)

Population (pop-code,population)

Country & Population are related with one-to-one relationship.

Constraints : Primary key and country name should not be null.

(a) Create a Relation Data Base.

(b) Write queries for the following

Give name and population of a country whose capital is 'Kigali'.

Count the number of countries whose population is > 6,000,000

Find the details of the country with the highest population.

Display country wise population details.

22) Write down html code that prints the following. **(15marks)**

First Name:

Last Name:

Password:

Language Used:

Kinyarwanda English French

Gender:

Male Female

COMPUTER SCIENCE

016

27/11/2017 8.30 AM- 11.30 AM

REB
Rwanda Education Board

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2017

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- **MATHS-COMPUTER SCIENCE-ECONOMICS (MCE)**
- **MATHS-PHYSICS-COMPUTER SCIENCE (MPC)**

DURATION: 3HOURS

INSTRUCTIONS:

1. Write your names and index number on the answer booklet as they appear on your registration form and **DO NOT** write your names and index number on additional sheets of paper if provided.
2. Do not open this question paper until you are told to do so.
3. This paper consists of **three** sections: **A, B** and **C**.

   Section A: Attempt **all** questions. **(55 marks)**

   Section B: Attempt **three** questions. **(30 marks)**

   Section C: Attempt **only one** question. **(15 marks)**
4. Use only a **blue** or **black** pen.

SECTION A: Attempt all questions (55marks)

1) List 6 devices that use USB port connector. **(6marks)**
2) What is an event in Visual basics? Give two examples. **(5marks)**
3) Differentiate between a variable from variable address. **(2marks)**

4) Write an algorithm which stores 5 numbers entered by a user in array and display them to the user. **(5marks)**

5) Give the codes for movenext, moveprevious methods in VB. **(2marks)**

6) What are the meanings of the following commands?
   a)Date : **(1mark)**

   b) Ls : **(1mark)**

   c)MD or mkdir **(1mark)**

7) Describe the system call in operating system. **(3marks)**

8) What are the outputs of the following program. **(2marks)**

```
#include <iostream>
using namespace std;
voidprevnext (int x, int&prev, int& next)
   {
prev = x-1;
next = x+1;
}
int main ()
{
int x=100, y, z;
prevnext (x, y, z);
cout<< "Previous=" << y << ", Next=" << z;
```

9) a) What are the functions of a database management system? **(2marks)**
   b) What are the roles of Intersection in SQL? **(2marks)**
   c) Give examples of intersection. **(2marks)**

10) What are the 3 characteristics of a printer? **(3marks)**

11) Write a program in C language to find a greater number of five numbers stored in array. **(5marks)**

12) Give an illustration of the following logic gates: NOT, AND, OR. **(3marks)**

13) List five types of instructions of a computer program? **(5marks)**

14) Write in full the following abbreviations: **(5marks)**

a) RJ45 b) VPN c) ISP d) ISO e) UTP

SECTION B: Attempt any three questions. (30marks)

15 a) What is a Table in SQL? **(2marks)**

b) Name and explain the types of identifiers. **(8marks)**

16) Write a C++ program to read through an array of any type. Write a C++ program to scan through this array to find a particular value. **(10marks)**

17) a)What is a file system? **(3marks)**

b) List four activities that an Operating System does/operate for file management. **(4marks)**

c) What are the functions of a file system? **(3marks)**

18) a) Write a function program in C programming language to multiply two numbers. **(7marks)**

b) The scope and lifetime of the variables defined in C is classified depending on the storage. Give 3 classes of storage variables. **(3marks)**

19) Using a switch, write an algorithm which receives a student and tells him his grades as follows: **(10marks)**

Note 16 and above: Grade A
Note 14-16 : Grade B
Note 12-14 : Grade C
Note below 12 : Grade D

SECTION C: Attempt only one question (15marks)

20) List and explain 5 basic concepts of Object Oriented Programming. **(15marks)**

21) Below is a table that contains information of teachers.

No	Name of Teacher	Age	Department	Date of Joining	Salary	Sex
1	Ndahimana	36	Computer	12-Jan-99	150000	M
2	Kamili	59	Maths	4-Mar-86	250000	M
3	Neema	30	Entrepreneurship	30-Jun-12	120000	F
4	Harima	29	Geography1	10-Apr-10	130000	F
5	Kasiimu	43	Geography2	12-Feb-88	200000	M
6	Nzabandora	32	Physics	1-Feb-00	230000	M
7	Ruterana	45	Kinyarwanda	12-Aug-85	240000	M
8	Shakilla	29	Maths	13-Jul-12	150000	F
9	Jackline	31	Geography1	12-Jan-11	120000	F
10	Jack	40	Physics	11-Sep-99	200000	M
11	Mutessa	28	Computer	9-Nov-14	120000	M

Write SQL commands:

a) To find the Teachers that did not join on the date of ("1/feb/2000" , "4/mar/1986","12/feb/1988"); **(2marks)**

b) To show all information about the Teachers of Maths Department. **(1mark)**

c) To List the Name and age of the female Teachers who are in the Geography1 Department. **(2marks)**

d) To list the names of all Teachers whose age is greater than 30 with their date of joining in ascending order. **(2marks)**

e) To display the Names, Age and Salary for male teachers only. **(2marks)**

f) Arrange the whole table in the alphabetical order of names. **(2marks)**

g) Display all Teachers whose Names contain the character"n" **(2marks)**

h) Remove duplicates Department from the table. **(2marks)**

COMPUTER SCIENCE

016

15/11/2016 8.30am- 11.30am

REB
Rwanda Education Board

ADAVANCED LEVEL NATIONAL EXAMINATIONS, 2016

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- **MATHS-COMPUTER SCIENCE-ECONOMICS: MCE**
- **MATHS-PHYSICS-COMPUTER SCIENCE: MPC**

DURATION: 3HOURS

INSTRUCTIONS:

1. Do not open this question paper until you are told to do so.
2. Write your name and index number on the answer booklet as written on your registration form.
3. This paper consists of **three** sections: **A, B** and **C.**

   Section A: Attempt **all** questions. **(55marks)**

   Section B: Attempt **three** questions. **(30marks)**

   Section C: Attempt **any one** question. **(15marks)**

4. Use only **blue** or **black** pen.

SECTION A: Attempt all questions in this section. (55 marks)

1) Complete the following result of a relational operation which is a Boolean value that can only be true or false, according to its Boolean result. **(5marks)**

   If a=2, b=3 c=6

   (a == 5)

   (a*b >= c)

   (b+4 > a*c)

   ((b=2) == a)

   !(c>b)

2) Consider the following declaration: **(2marks)**

   (i) short i=10;

   (ii) static i=10;

   (iii) unsigned i=10;

   (iv) const i=10;

   Choose the correct answer:

   a) Only (iv) is incorrect

   b) Only (ii) and (iv) are incorrect

   c) Only (ii),(iii) and (iv) are correct

   d) Only (iii) is correct

   e)All are correct declarations

3) What are the functions of a hard drive? **(2marks)**

4) What are the functions of the following? **(4marks)**

   (a) Antivirus Program (b) Spyware Remover

   (c) Firewall (d) NIC

5) What are the four main roles of operating systems? **(4marks)**

6) What is a control in VB? Give three of its examples. **(5marks)**

7) What are the differences between a form module and standard module? **(2marks)**

8) Write an algorithm which receives water temperature and displays the states of water as follows: **(5marks)**

   Bellow 0 : state is Solid

   Bellow 100 : state is Liquid

   100 and above : state is Gas.

9) What are the 6 common services provided by operating systems? **6marks)**

10) What are the differences between a function call and a system call operating system? **(3marks)**

11) What is a block of statement? **(2marks)**

12) What are the outputs of the following program? **(4marks)**

```
#include <stdio.h>main()
{inti = 10;
while ( i> 0 )
```

```
{printf("Hello %d\n", i );
i = i -1;
if(i == 6 )
      {
break; }
   }}
```

13) What are the outputs of the following program? **(4marks)**

```
#include <iostream>
using namespace std;
int subtraction (int a, int b)
{
int r;
r=a-b;
return (r);
}
int main ()
{
int x=5, y=3, z;
z = subtraction (7,2);
cout<< "The first result is " << z << '\n';
cout<< "The second result is " << subtraction (7,2) << '\n';
cout<< "The third result is " << subtraction (x,y) << '\n';
z= 4 + subtraction (x,y);
cout<< "The fourth result is " << z << '\n';return 0    }
```

14) Give four examples of DBMS languages. **(4marks)**

15) Distinguish data integrity from data security. **(3marks)**

SECTION B: Attempt any three questions (30 marks)

16) a)What is a computer? **(2marks)**

b) Describe the four main categories of computers. **(8marks)**

17) a)Define the following networking devices: **(5marks)**

(i) Router (ii) Gateway (iii) Bridge

(iv) Hub (v) Repeater

b) Complete the following table which are IP address classes and subnetmasks. **(5marks)**

Class	First Octet – to	Default Subnet Mask	Number of Networks
A			
B	128 to 191		16,384
C	192 to 223		2,097,152

18) Write a program in C++ containing two functions that return values. The first Function returns the higher of two numbers entered by the user. The second Function returns the lowest number. The parameters for the two functions are entered through the main function. **(10marks)**

19) Write an algorithm and the flowchart for the problem that allows the user to input three numbers and display the sum, the average and their product.
Flowchart: **(10marks)**

20) Write SQL commands on the basis of EMPLOYEES table given below:

EMPLOYEES

Employee No.	Firstname	Lastname	DeptNo	Jobs	Salary (Frw)	Commission (Frw)
1	Hakizimana	Moses	10	manager	300,000	25,000
2	Harindintwari	J claude	10	driver	100,000	5,000
3	Mukakimenyi	Vanessa	15	president	750,000	00
4	Mutimukeye	Sandrine	15	clerk	150,000	00
5	Uwambajimana	Hackimu	12	driver	120,000	00
6	Kalisa	Eric	12	analysis	350,000	10,000
7	Harimpisya	Edson	10	clerk	180,000	7,000
8	Tumwebaze	Hamisi	15	security	800'000	00
9	Mutoni	Sandrine	15	manager	280,000	15,000
10	Umuhoza	Yvonne	10	reception	110,000	1,000
11	Tumusifu	Emmanuel	12	analysis	400,000	5,000

a) To show total salary for manager's Job and rename salary as managers' salary. **(2marks)**

b) Find all Employees whose Department is the same as that of "Tumusifu" **(1mark)**

c) Display Fist name, last name, Job, Commission and Increase the Commission of all Employees by 10%. **(2marks)**

d) Count the available Employees in the table. **(1mark)**

e) Show by Names and the Commission for the Employees who receive the commission (Frw) of 1000,5000 and 00 respectively. **(2marks)**

f) Display all Employees that do not receive any Commissions. **(2marks)**

SECTION C: Attempt only one question (15marks)

21) a) Define "Concurrence in SQL". **(3marks)**

b) List and explain 6 constraints in SQL. **(12marks)**

22) Write a VB program to find Fibonacci series up to a given term (useInputBox). **(15marks)**

Computer Science

016

17/11/2015 8.30- 11.30 AM

REB
Rwanda Education Board

ADAVANCED LEVEL NATIONAL EXAMINATIONS, 2015

SUBJECT: COMPUTER SCIENCE

COMBINATIONS: MATHS-COMPUTER SCIENCE-ECONOMICS: MCE
MATHS-PHYSICS-COMPUTER SCIENCE: MPC

DURATION: 3HOURS

INSTRUCTIONS:

1. Do not open this question paper until you are told to do so.
2. This paper consists of **three** sections: **A, B** and **C.**
   Section A: Attempt **all** questions. **(55marks)**
   Section B: Attempt **three** questions. **(30marks)**
   Section C: Attempt **any one** question. **(15marks)**
3. Use Blue or black pen

SECTION A: ATTEMPT ALL QUESTIONS. (55 MARKS)

1) Which controls have refresh method in VB 6? **(4marks)**

2) Write an algorithm which receives a number and informs the user when it is negative. **(4marks)**

3) Which of the following are hardware and software? **(2marks)**
   (a) Capacitor
   (b) Internet Explorer
   (c) Hard disk
   (d) UNIX

4) What are the DBMS languages? Explain with examples. **(4marks)**

5) What is a *flowchart*? **(3marks)**

6) What is domain name system (DNS)? **(3marks)**

7) In a network that contains two servers and twenty workstations, where is the best place to install an Anti-virus program? Explain why. **(3marks)**

8) (a)What are data types? **(2marks)**
   (b)What are all the predefined data types in c++? **(2marks)**

9) What will be the output of the following program segment? **(4marks)**
   If input is as: (a) g, (b) b, (c) e, (d) p

```
cin>>ch;
switch (ch)
{
case 'g': cout<<"Good";
case 'b': cout<<"Bad";
break;
case 'e': cout<<" excellent ";
break;
default: cout<<" wrong choice";
}
```

10) A hard disk is divided into tracks which are further subdivided into: **(1mark)**
   (a) Clusters
   (b) Sectors
   (c) Vectors
   (d) Heads
   (e) None of the above

11) (a) What is the role of union in SQL? **(3marks)**

(b) What is the difference between DELETE and DROP SQL statement? **(3marks)**

12) Using suitable examples, explain how you can give comments in C program. **(4marks)**

13) What are the 4 disadvantages of data base management system? **(4marks)**

14) Write C program to accept a string and find out total numbers of characters. **(5marks)**

15) Distinguish the Private members from Protected members. **(4marks)**

SECTION B: ATTEMPT ANY THREE QUESTIONS. (30 MARKS)

16) (a) Define the terms: entity, attribute and relationship between the entities, giving examples for each of them. **(6marks)**

(b) What are the differences between database normalization and database de-normalization? **(4marks)**

17) Write a C++ program to print the following pattern. **(10marks)**

```
    *
   ***
  *****
 *******
*********
```

18) Distinguish the features of fourth generation from features of first generation computers. **(10marks)**

19) Define a class Applicant in C++ with following description **(10marks)**

Private Members

- A data member ANo (Admission Number) of type long
- A data member Name of type string
- A data member Agg (Aggregate Marks) of type float
- A data member Grade of type char

- A member function GradeMe() to find the Grade as per the Aggregate Marks obtained by a student. Equivalent Aggregate Marks range and the respective Grades are shown as follows:

  Aggregate Marks Grade

  >=80 A

  less than 80 and >=65 B

  less than 65 and >=50 C

  less than 50 D

Public Members

- A function ENTER() to allow user to enter values for ANo, Name, Agg and call function GradeMe() to find the Grade.
- A function RESULT() to allow the user to view the content of all the data members.

20) In a company an employee is paid as: Appli **(10marks)**

If his basic salary is less than 15,000Frw, then

HRA=10% of basic salary

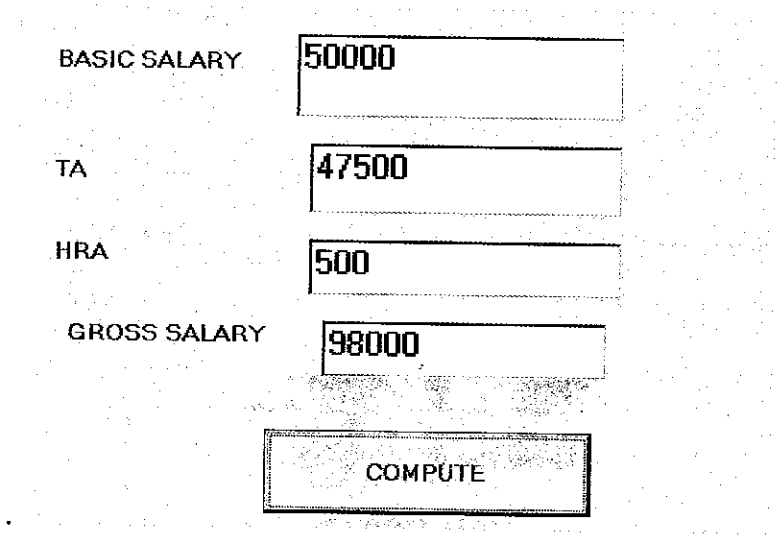
TA=90% of basic salary

If his salary is either equal to or above 15,000Frw, then

HRA= 500Frw

TA=95% of basic salary. If the employee's basic salary is input through the keyboard write a visual basic program to display his gross salary, TA and

HRA in the text box EX:



SECTION C: ATTEMPT ONLY ONE QUESTION. (15 MARKS)

21) Complete the following table which is binary number representation.

(5marks)

	B3	B2	B1	B0
3	0	0	1	1
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

(a) Find decimal equivalent of (1200.011)8 = (?)10. **(2marks)**

(b) Subtract (11110.1101)2 from (111111.1111)2. **(2marks)**

(c) Find binary equivalent of (251.35)10 = (?)2. **(2marks)**

(d) Find decimal equivalent of $(14AC)_{16}$ = (?)10. **(2marks)**

(e) Find decimal equivalent of $(123A)_{16}$ = (?)10. **(2marks)**

22) **Consider the following tables EMPLOYEE and SALGRADE and answer the questions that follow :**

App.

Table: EMPLOYEE

ECODE	NAME	DESIG	SGRADE	DOJ	DOB
101	KAREKEZI Ange	EXECUTIVE	S03	23-Mar-2003	13-Jan-1980
102	GANZA Kevin	HEAD - IT	S02	12-Feb 2010	22-Jul-1987
103	MUTONI Rehma	RECEPTIONIST	S03	24-June-2009	24-Feb-1983
105	NKUSI Anicet	MANANEGER	S02	11-Aug-2006	03-Mar-1984
108	KARENZI Abdul	CEO	S01	29-Dec-2004	19-Jan-1982

Table: SALGRADE

SGRADE	SALARY	HRA
S01	56000	18000
S02	32000	12000
S03	24000	8000

Write SQL commands for the following statements:

I. To display the details of all EMPLOYEES, in descending order of DOJ.

(2marks)

II. To display NAME and DESIG of those EMPLOYEEs, whose SALGRADE are either S02 or S03. **(2marks)**

III. To display the content of all the EMPLOYEEs table, whose DOJ are in between'09- Feb-2006' and '08-Aug-2009'. **(2marks)**

IV. To add a new row with the following:

109, 'Harish Roy', 'HEAD-IT', 'S02', '09-Sep-2007, '21-Apr-1983' **(2marks)**

V. Give the output of the following SQL queries:

(a) SELECT COUNT(SGRADE) AS CODE, SGRADE FROM EMPLOYEE GROUP BY SGRADE; **(2marks)**

(b) SELECT MIN(DOB) AS MIN, MAX(DOJ) AS MAXDOB FROM EMPLOYEE; **(2marks)**

(c)SELECT SGRADE, SALARY+HRA FROM SALGRADE WHERE SGRADE= 'S02'; **(1 mark)**

(d)SELECT SGRADE, (SALARY+HRA)*5/100 FROM SALGRADE WHERE SGRADE='S02'; **(1mark)**

(e) SELECT NAME,SALARY FROM EMPLOYEE E, SALGRADE S WHERE E.SGRADE= S.SGRADE AND E.ECODE<103; **(1mark)**

COMPUTER SCIENCE

016

04/11/2014 2PM- 5PM

Rwanda Education Board

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2014

SUBJECT : COMPUTER SCIENCE

COMBINATIONS: MATHS-COMPUTER SCIENCE-ECONOMICS (MCE)

MATHS-PHYSICS-COMPUTER SCIENCE (MPC)

DURATION: 3HOURS

INSTRUCTIONS:

1. Write your names and index number on the answer booklet as written on your registration form, and **DO NOT** write your names and index number on additional answer sheets of paper if provided.
2. Do not open this question paper until you are told to do so.
3. This paper has **THREE** sections **A** , **B** and **C.**

   SECTION A : This section is compulsory. **(55 marks)**

   SECTION B : Attempt any **three** questions. **(30 marks)**

   SECTION C : Attempt **Only one** question. **(15 marks)**
4. Use only blue or black pen and pencil.

SECTION A: ATTEMPT ALL QUESTIONS. (55 marks)

1. Give 3 examples of an audio port that connects audio devices to the computer. **(3marks)**

2. List the 3 motherboard form factors. **(3marks)**

3. Tick in the cell where the device matches with the device type as shown below. **(4 marks)**

N°	DEVICES	INPUT DEVICES	OUTPUT DEVICES	STORAGE DEVICES
1	**Touchpads**			
2	**Light Pen**			
3	**Scanner**			
4	**Electronic Whiteboard**			
5	**RAID**			
6	**Speaker(s)**			
7	**Monitor**			
8	**PC Card**			

4. Write an algorithm that asks the user to enter two numbers and it displays the product of those numbers if it is nul, negative or positive. **(6marks)**
5. What is a loop? **(2marks)**
6. Write an algorithm which uses **do ... while** loop and displays numbers from 1 to 5. **(4marks)**
7. Distinguish seek time from data rate. **(3marks)**
8. Study the program below and answer the questions that follow.

```
#include <stdio.h>

int g = 20;

int main ()

{int g = 10;

printf ("value of g = %d\n", g); return 0; }
```

(a) What is the output ? **(2marks)**

(b) Explain why that output. **(3marks)**

9. (a) What is data structure? **(2marks)**
   (b) Show with examples how the data structures are declared. **(3marks)**
10. Which of the following is not derived data type in c? **(2marks)**

(a) Function (b) Pointer (c) Enumeration
(d) Array (e) All are data type

11. Which of the following is an integral data type? **(2marks)**

(a) Void (b) Char (c) Float (d) Double

(e) None of these

12. Explain the importance of : **(3marks)**

(a) plug and play system (b) Shell

13. What is a Protocol? **(2marks)**

14. Describe 4 advantages of using relations database system in tables. **(4marks)**

15. How is the memory in multi-process system managed? **(2marks)**

16. Describe the Trash can icon in the Linux . **(3marks)**

17. Multiply (1000.10)2 by (10.1)2 . **(2marks)**

SECTION B: ATTEMPT ANY THREE QUESTIONS. (30 marks)

18. Swapping means exchanging the values of one variable with another variable. Write a C function that swaps two numbers and display the values of those numbers before and after the swap. **(10marks)**

19. (a) Create a table of your choice with at least 4 different attributes in SQL. **(2marks)**

(b) Given an "Employee" table below:

Name	Phone	Address	Salary	Evaluation
Kanamugire	08564433	Kacyiru	185000	0.75
Rurangwa	51231578	Nyamata	123000	0.90
Bahizi	03314563	Rwamagana	230000	0.80
Giraneza	08567838	Remera	197000	0.85

Write SQL statements for :

(i) Inserting a new employee into the table. **(2marks)**

(ii) Updating the table to give a salary increase of 20% to those employees whose evaluation is above or equal to 0.80. **(2marks)**

(ii) Destroying table name " "Employee" ". **(2marks)**

(iv) List the names, salary and address of employees whose evaluation are less than 0.8 or greater than 0.85. **(2marks)**

20. (a) Define a bit. **(2marks)**

(b) Find the binary equivalent of (353.45)10. **(2marks)**

(c) Convert (7834.523)10 to octal system. **(2marks)**

(d) Convert (56734.5275)10 into hexadecimal. **(2marks)**

(e) Represent "-18" in signed magnitude form. **(2marks)**

21. Write a C++ program that decreases the numbers from 10 to 0 number and when it reaches to number 4 it skips that iteration, using loop. **(10marks)**

22. (a) What are the uses of RDMS in a database? **(8marks)**

(b) What is a projection in SQL ? **(2marks)**

SECTION C: ATTEMPT ANY ONE QUESTION. (15 marks)

23. What are the functions of the following codes? **(15 marks)**

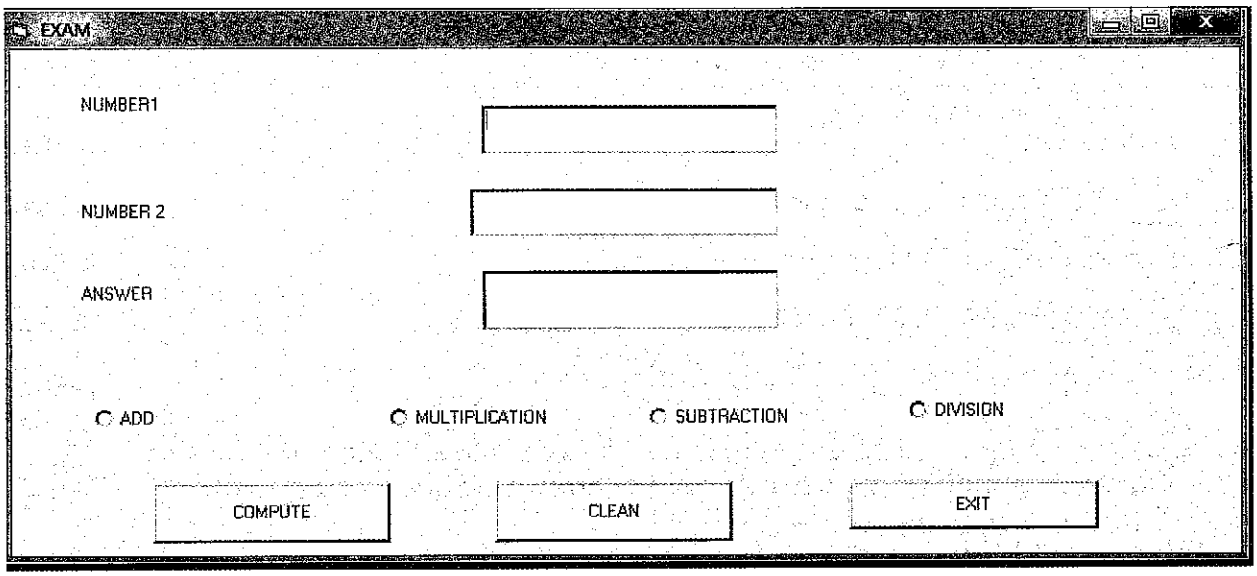
(a) ls	(b) cd	(c) cp	(d) rm
(e) pwd	(f) cat	(g) Ip config	(h) ping
(i) chkdsk	(j) comp	(k) erase	(l) deltree
(m) dir	(n) restore	(o) undelete	

24. (a) Enumerate the procedures followed to create a new project in VISUAL BASICS. **(6marks)**

(b) Write a VB Program **(9marks)**

- If a user checks the first option (Option1), the program should display the addition of the numbers entered in Text1 and Text2 in the Text3 if a user clicks to a button compute.
- If a user checks the second option (Option2), the program should display the multiplication of the numbers entered in Text1 and Text2 in the Text3 if a user clicks to a compute button.
- If a user checks the third option (Option3), the program should display the subtraction of the number entered in Text1 by Text2 in Text3 if a user clicks to a compute button.
- If a user checks the fourth option (Option4), the program should display the division of the number entered in Text1 by Text2 in Text3 if a user clicks to a compute button.
- The program should display nothing in Text1, Text2 and Text3 if a user clicks to a Clear button.
- Remember the program should be closed.

For example : Assume that a user checked the following program



Computer Science

016

05 Nov.2013 8.30am – 11.30 am

REPUBLIC OF RWANDA

RWANDA EDUCATION BOARD

ADAVANCED LEVEL NATIONAL EXAMINATIONS 2013

SUBJECT: COMPUTER SCIENCE

COMBINATIONS : MATHS-COMPUTER SCIENCE-ECONOMICS: MCE
MATHS-PHYSICS-COMPUTER SCIENCE: MPC

DURATION : 3 HOURS

INSTRUCTIONS :

1. Do not open this paper until you are told to do so.
2. This paper consists of **three** sections: **A**, **B** and **C**.
   Section A: This section is compulsory. **(55 marks)**
   Section B: Attempt **three** questions. **(30 marks)**
   Section C: Attempt **any one** question. **(15 marks)**
3. Use only blue pen.

Section A: Attempt all questions (55 marks)

1. Define a flowchart. **(2marks**
2. What makes up a Visual Application (Project)? **(7marks**
3. What are the three ways for a variable to be declared? **(3mark**
4. What are the three ways to connect to a database in Visual Basic? **(3Mark**
5. Define Object Oriented Programming. **(3mark**
6. Distinguish 'while' and 'do – while' statements. **(8mark**
7. List the different types of parameter passing techniques. **(3mark**
8. Define class. **(2mark**
9. Where will you classify a member function? **(4mark**
10. What is the use of a destructor? **(3mark**
11. What is the difference between structure and a class? **(3mark**
12. Define virtual function. **(6mark**
13. What is meant by pointer and null pointer? **(4mark**
14. Give any two error handling functions and their purposes. **(4mark**

Section B: Attempt any three questions from this section. (30 marks)

15. Define the following:

a) Branching Statements. **(2,5marks)**

b) Looping Statements **(2,5marks)**

c) **if** statement. **(2,5marks)**

d) **while** statement. **(2,5marks)**

16. Write a pseudocode of an algorithm that will read the two sides of a rectangle and calculate its area. **(10marks**

17. Convert the binary number 1111011 to decimal number. **(10marks**

18. How does a main () function in C++ differ from main () in C? **(10marks**

19. What is ADO? What are its objects? **(10marks**

Section C: Attempt any one question from this section (15 marks)

20. Write a C program to print fibonacci series (0 1 1 2 3 5 8 13).

21. Write an algorithm to find the sum and average of three given numbers.

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Computer Science

016

19 Nov.2012 8.30 am – 11.30 am

REPUBLIC OF RWANDA

RWANDA EDUCATION BOARD (REB)

ADAVANCED LEVEL NATIONAL EXAMINATIONS 2012

SUBJECT: COMPUTER SCIENCE

COMBINATIONS : MATHS-COMPUTER SCIENCE-ECONOMICS: MCE

MATHS-PHYSICS-COMPUTER SCIENCE: MPC

DURATION : 3 HOURS

INSTRUCTIONS :

This paper consists of **three** sections: **A**, **B** and **C**.

Section A: Attempt **all** questions. **(55 marks)**

Section B: Attempt **three** questions. **(30 marks)**

Section C: Attempt **any one** question. **(15 marks)**

SECTION A: Attempt all questions (55 marks)

1. What is a computer program? **(3 marks)**
2. What is computer programming? **(3 marks)**
3. a. Explain the term *stored procedure.* **(3 marks)**
   b. Briefly explain the advantages of using stored procedures. **(6 marks)**
4. What will be the output of the following code? **(5 marks)**

```
#include<stdio.h>
#define max 10+2
int main()
    {
      int i;
      i=max*max;
      printf("%d",i);
      return 0;
    }
```

5. In the table bellow give and explain with examples the 6 Arithmetic Operators of Visual Basic? **(12 marks)**

   Each Operator 1 mark, Meaning in words 0.5 marks,

   Example (Arithmetic expression) 0.5 mark.

Operator	Meaning in words	Example (Arithmetic expression)

6. a) What is Visual Basic? **(2 marks)**
   b) How is VB program made up? **(3 marks)**
7. What are the responsibilities of a DBA (Database Administrator)? **(4 marks)**
8. Why does a DBMS interleave the actions of different transactions instead of executing transactions one after the other? **(4 marks)**
9. Explain the following terms briefly: **(10 marks)**

   a) attribute, *b) entity,* *c) relationship,*
   d) relationship set, *e) one-to-many relationship,* *f) many-to-many relationship,*
   g) participation constraint, *h) weak entity set,*
   i) aggregation, k) *role indicator.*

SECTION B: Attempt any three questions from this section (30 marks)

10. GCD of two numbers is a largest positive numbers which can divide both numbers without any remainder. For example GCD of two numbers 4 and 8 is 2 since 2 is the largest positive number which can dived 4 as well as 8 without a remainder. Write a c program for finding gcd (greatest common divisor) of two given numbers. **(10 marks)**

11. Answer the questions below concerning the following fragment of code in C++.

```
int n;
{
cout << "Enter an integer: ";
cin >> n;
    if (n < 10)
      {
        cout << "less than 10" << endl;
   else if (n > 9)
        cout << "greater than 9" << endl;
   else
        cout << "not interesting" << endl;
       }
  }
```

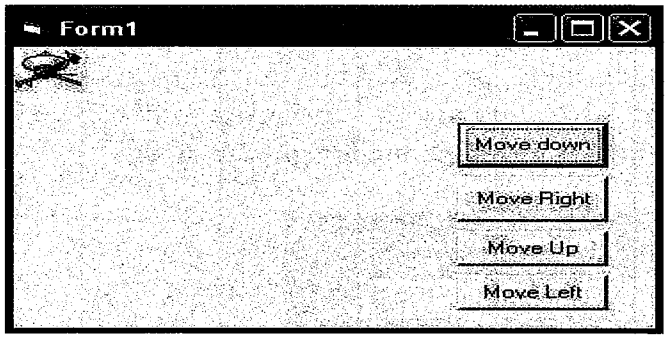
a. What will be the output of the fragment above if the user enters the integer value 0? **(2.5 marks)**

b. What will be the output of the fragment above if the user enters the integer value 15? **(2.5 marks)**

c. What will be the output of the fragment above if the user enters the integer value 7? **(2.5 marks)**

d. What values for n will cause the output of the fragment above to be "not interesting"? **(2.5 marks)**

12. Below is a program that can move an object up, down, left, and right every time you click on a relevant command button. The code is such that Image1.Top = Image1.Top + 100 which makes the distance increase or decrease every time a user clicks on the command button. For example, if the initial position of image1 is 1000 twip from the top, after one click, the distance from the top will be 1100, and the next distance will be 1200 and so on. Write the program for all the four buttons that allows you to move the image in four directions by clicking any of the four buttons. **(10 marks)**



13. Explain how the following steps are performed in JDBC:

a. Connect to a data source. **(4 marks)**

b. Start, commit, and abort transactions. **(4 marks)**

c. Call a stored procedure. **(2 marks)**

14. Consider the following relations:

Student (*snum:* integer, *sname:* string, *major:* string, *level:* string, *age:* integer)

Class (*name:* string, *meets at:* string, *room:* string, *fid:* integer)

Enrolled (*snum:* integer, *cname:* string)

Faculty (*fid:* integer, *fname:* string, *deptid:* integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Write the following queries in SQL. No duplicates should be printed in any of the answers.

a) Find the names of all Juniors (level = JR) who are enrolled in a class taught by 1Teacher. **(4 marks)**

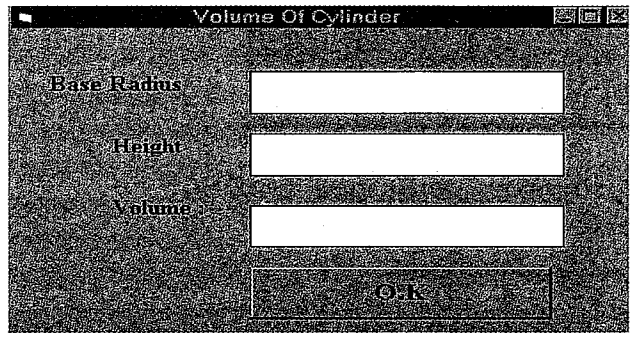
b) Find the age of the oldest student who is either a History major or enrolled in a course taught by one Teacher. **(6 marks)**

SECTION C : Attempt any of one question from this section (15 marks)

15. Write a c program for ATM transaction while currencies are 1000,500 and 100. **(15 marks)**

16. An airplane has a registration number, type and location (City Airport base of the airplane). Each airplane type is described by its name (Boeing 747, Airbus A340 ...), its weight, its capacity and range. A company technician has a name, number (matriculate), address (city of residence), phone number, salary and is an expert on one or several types of airplane during a given period (beginning date and end date). A driver is described by the same attributes as a technician. In addition it must pass an annual medical examination. Each plane must also pass a number of testing work. Each test has a number that identifies a name and a minimum value (a threshold to be reached). We want to keep the date and status of each test. Each flight is commanded by a single pilot on one plane A flight departure city (Departure_City) and city of arrival (Arrival _City), time of departure (Departure-hour) and time of arrival (arrival_hour). Make a conceptual data model (entities relationship and associations model). Do not forget the cardinalities and underline the keys. **(15 marks)**

17. Knowing that the formula to compute the volume of a cylinder is v=pi*(r^2)*h where v= volume; pi= 22/7; r= radius and h= height. Write a required code to make a program that calculates the volume of a cylinder using the VB interface as designed bellow: **(15 marks)**



When you run the program, you should be able to see the interface as shown in. If you enter a value each in the radius box and the height box, then click OK; the value of the Volume will be displayed in the volume box.

NB: Using the function Str$. The declaration step is not required.

Computer Science

015

07 Nov.2011 8.30am -11.30 am

REPUBLIC OF RWANDA

RWANDA EDUCATION BOARD (REB)

P .O.BOX 3817 KIGALI. TEL/FAX: 586871

ADAVANCED LEVEL NATIONAL EXAMINATIONS 2011

SUBJECT: COMPUTER SCIENCE

COMBINATIONS : MATHS-COMPUTER SCIENCE-ECONOMICS: MCE
MATHS-PHYSICS-COMPUTER SCIENCE: MPC

DURATION : 3 HOURS

INSTRUCTIONS :

This paper consists of **three** sections: **A**, **B** and **C**.

Section A: Attempt **all** questions. **(55 marks)**

Section B: Attempt **three** questions. **(30 marks)**

Section C: Attempt **any one** question. **(15 marks)**

SECTION A: Attempt all questions from this section. ***(55 marks)***

01. Distinguish the different families of computers. ***(4 marks)***

02. State **five** differences between DOS and Linux. ***(5 marks)***

03. List **four** different types of Web Browsers. ***(4 marks)***

04. Convert 1011.101_2 to decimal. ***(4 marks)***

05. Convert 183 to binary. ***(4 marks)***

06. Explain the DOS commands below: ***(6 marks)***

FDISK:
FORMAT:
ATTRIB:
SYS:
CHKDSK:
TREE:

07. What is an algorithm and how are algorithms essential? ***(5 marks)***

08. What does e-commerce mean? ***(3 marks)***

09. What is a Browser? ***(3 marks)***

10. Explain the advantages of using database management system than a file system of an end user? ***(6 marks)***

11. What is computer programming? ***(2 marks)***

12. What are the uses of a computer? ***(3 marks)***

13. Define the term Client-server? ***(2 marks)***

14. Define "front-ends" and explain why they are called so. ***(3 marks)***

15. Which is the correct hierarchy of data from the smallest to the largest is : ***(1 mark)***
    (a) bits-->characters-->fields-->records-->files
    (b) characters-->records-->fields-->files-->database
    (c) database-->files-->fields-->records-->characters
    (d) fields-->files-->records-->characters-->database

SECTION B: Attempt any three questions. ***(30 marks)***

16. Rewrite the following code fragment so that it uses a "do...while..." loop to accomplish the same task. ***(10 marks)***

```
int n;
cout << "Enter a non-negative integer: ";
cin >> n;
while (n < 0)
{
        cout << "The integer you entered is negative." << endl;
        cout << "Enter a non-negative integer: ";
        cin >> n;
}
```

17. With short explanation give **three** advantages and **two** disadvantages of the Internet ***(10 marks)***

18. Explain objects, classes and clients? How do clients and components communicate? ***(10 marks)***

19. Give the meaning of the following queries (one line of explanation is required).

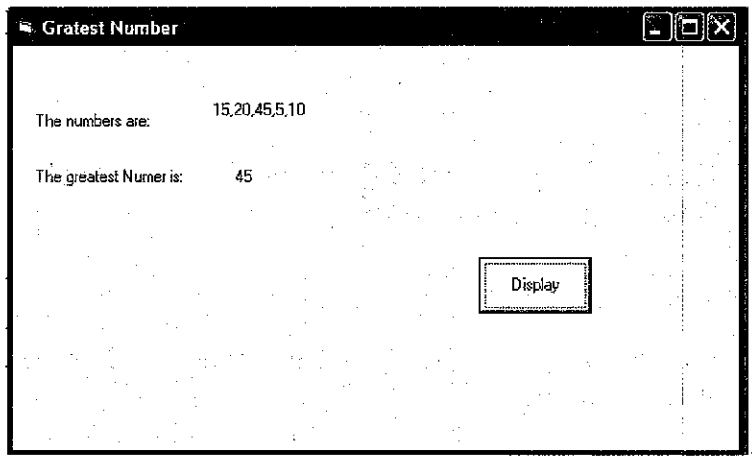
(a)
```
select * from avion where capacite < 350
        union
select * from avion
where localisation = 'Nairobi';
```
(5 marks)

(b)
```
select * from vol where ville_dep = 'Nairobi'
        intersect
select * from vol where ville_arr = 'Kigali'
        intersect
select * from vol where h_dep > 6 PM;
```
(5 marks)

20. Why is a hard disk technically 80 GB but the operating system treats it as 72GB? ***(10 marks)***

SECTION C: Attempt any one question from this section. ***(15 marks)***

21. 1. Write in Visual Basic a program to find the greatest of five numbers as shown below: ***(15 marks)***



22. A "1.44 MB" floppy disk has 80 cylinders (numbered 0 to 79), 2 heads (numbered 0 to 1) and 18 sectors (numbered 1 to 18).
Calculate, its capacity in sectors. ***(15 marks)***

23. Draw a Flow chart of an algorithm (Euclid's algorithm) for calculating the greatest common divisor (g.c.d) of two numbers **a** and **b** in locations named **A** and **B**. The algorithm proceeds by successive subtractions in two loops: IF the test **B** ≤ **A** yields "yes" (or true) (more accurately the number **b** in location **B** is less than or equal to the number **a** in location **A**) THEN the algorithm specifies **B** ← **B** - **A** (meaning the number **b** - **a** replaces the old **b**). Similarly IF **A** > **B** THEN **A** ← **A** - **B**. The process terminates when (the content of) **B** is **0**, yielding the g.c.d in **A**. ***(15 marks)***