

Computer Science

Date: 22/06/2022
Period: 8H30'-11H30'



END OF TERM III EXAMINATIONS

GRADE / LEVEL: **Advanced Level, S5**

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

DURATION: **3 Marks**

MARKS: **..... / 100**

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.

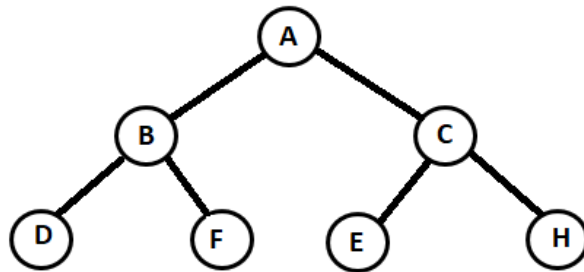
(55 marks)

- 1) List any five examples of portable devices. **(5 Marks)**
- 2) List and define three standard streams in java. **(6 Marks)**
- 3) Define this() and super() in java. **(5 Marks)**

- 4) Prove the exact output produced by the following main() routine: **(5 Marks)**

```
public static void main(String[] args)
{ int x,y;
  x = 5; y = 1;
  while (x > 0)
  { x = x - 1;
    y = y * x;
    System.out.println(y); } }
```

- 5) Determine the order in which the elements would be accessed during Pre-Order, In Order and Post-Order traversals. **(6 Marks)**



- 6) Transmission media are broadly classified into two groups: Guided and Unguided media. Explain each group. **(5 Marks)**
- 7) A database contains a table with eight fields. The table currently has 100 records and each has data in each field. Answer the following question: **(3 Marks)**
 - a. How many entities are contained in the database?
 - b. How many attributes are contained in database?
 - c. How many individual pieces of data are in the database?

8) Suggest an output of the following program

(2 Marks)

```
#include<iostream>
    using namespace std;
    int main (){
    int num, *ptr1, *ptr2;
    ptr1=&num;
    ptr2=ptr1+8;
    cout<<"the difference is:"<<ptr2-ptr1<<endl;
    return 0;
    }
```

9) List any three advantages of inheritance

(3 Marks)

10) Answer **TRUE** or **FALSE**, the following sentences related to vb: **(2 Marks)**

- a) A project is an anything that is found on the computer specifically on the desktop.
- b) A class is collection of object with similar type

11) Write a class definition that creates a class called leverage with one private data member,crowbar, of type int and one public function whose declaration is void pry().

(4 Marks)

12) Write a Java program to print 'Hello' on screen and then print your name on a separate line. Using input from the user

(6 Marks)

13) You are browsing a website on the internet while the speed is okay and suddenly you find that the page is loading slowly. Investigate the reason behind slowness?

(3 Marks)

SECTION B: ATTEMPT THREE QUESTIONS.

(30 Marks)

14) write a Java program to sort a numeric array and a string array. **(10 Marks)**

15) Compare computerized vs non-computerized database with at least 5 for each. **(10 Marks)**

16) Using a pointer write a C++ program which will ask the user to enter data and compute the area of a rectangle. Area = width*length. **(10 Marks)**

17) Build an application by using vb6.0 or vb.net to calculate the volume of the cylinder($V = \pi r^2 h$) **(10 Marks)**

18) a) Represent the employee relation in the conceptual model **(4 Marks)**

employees relation				
EmpId	FirstName	Surname	Address	Birthdate

b) The following table describes information about employees, study it and answer the following questions. **(6 Marks)**

EmpId	EmpSname	EmpFname	EmpLocation	EmpJobCode
1011	RUKUNDO	Jean Claude	Kigali	12
1013	NYIRAMANA	Sylvane	Huye	19
1014	UWIMANA	Yvette	Muhanga	29
1021	KAGABO	Peter	Musanze	13

- a. What is the possible domain for field EmpId?
- b. How many records are shown?
- c. How many attributes are shown?

SECTION C: ATTEMPT ANY ONE QUESTION.

(15 marks)

19) Explain Elements of the Integrated Development Environment (IDE) in Visual basic **(15 Marks)**

20) Create a class student with the following specification **(15 Marks)**

Private members of class student:

admno integer

sname 20 character

eng. math, science float

total

float total() a function to calculate eng + math + science with float return type.

Public member function of class student

Takedata() Function to accept values for admno, sname, eng, science and invoke ctotal() to calculate total.

Showdata() Function to display all the data members on the screen.

End !!!!

Computer Science

MARKING GUIDE



END OF TERM III EXAMINATIONS

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DURATION: **3 Marks**

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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) List any five examples of portable devices.

(5 Marks)

Answer

Portable devices:

- a) **Laptops**
 - b) **Smartphones**
 - c) **cell phones**
 - d) **Personal Digital Assistants**
 - e) **Tablets**
- 2) List and define three standards stream in java.

(6 Marks)

Answer

Java provides the following three standard streams:

- i. Standard Input:** This is used to feed the data to user's program and usually a keyboard is used as standard input stream and represented as **System.in**.
- ii. Standard Output:** This is used to output the data produced by the user's program and usually a computer screen is used to standard output stream and represented as **System.out**.
- iii. Standard Error:** This is used to output the error data produced by the user's program and usually a computer screen is used to standard error stream and represented as **System.err**.

- 3) Define this() and super() in java.

(5 Marks)

Answer

this() is used to access one constructor from another with in the same class while super() is used to access superclass constructor. Either this() or super() exists it must be the first statement in the constructor.

- 4) Prove the exact output produced by the following main() routine: **(5 Marks)**

```
public static void main(String[] args)
{ int x,y;
x = 5; y = 1;
while (x > 0)
{ x = x - 1;
y = y * x;
System.out.println(y); } }
```

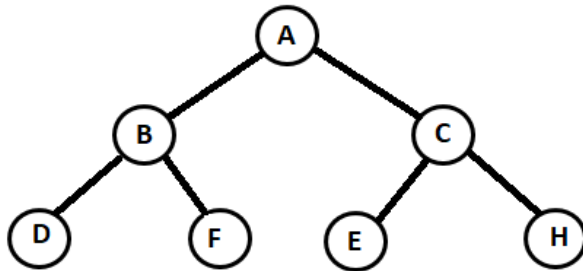
Answer

Output:

4
12
24
24
0

- 5) Determine the order in which the elements would be accessed during Pre-Order, In Order and Post-Order traversals. **(6 Marks)**

Answer



Answer

Pre-order: A B D F C E H

In-order: D B F E C H A

Post-order: D F B E H C A

- 6) Transmission media are broadly classified into two groups: Guided and Unguided media. Explain each group. **(5 Marks)**

Answer

Wired or Guided Media: are the cables that are tangible or have physical existence and are limited by the physical geography. Example guided media are: Twisted pair cable, co-axial cable and fiber optical cable.

• **Wireless or Unguided Media** are the ways of transmitting data without using any cables.

These media are not bounded by physical geography. Example of unguided media are:

Radio wave, Infrared, Bluetooth.

7) A database contains a table with eight fields. The table currently has 100 records and each has data in each field. Answer the following question:

(3 Marks)

- a. How many entities are contained in the database?
- b. How many attributes are contained in database?
- c. How many individual pieces of data are in the database?

Answer

a) one entity

b) 8 attributes

c) 800 piece of data Order, and make a relationship between those tables.

8) Suggest an output of the following program

(2 Marks)

```
#include<iostream>
using namespace std;
int main (){
int num, *ptr1, *ptr2;
ptr1=&num;
ptr2=ptr1+8;
cout<<"the difference is:"<<ptr2-ptr1<<endl;
return 0;
}
```

Answer

The difference is 8

9) List any three advantages of inheritance

(3 Marks)

Answer

1. Inheritance helps the code to be reused in many situations.(reusability)
2. It increases program structure which result in greater reliability.

3. Saves Time and Effort

10) Answer **TRUE** or **FALSE**, the following sentences related to vb: **(2 Marks)**

- a) A project is an anything that is found on the computer specifically on the desktop.
- b) A class is collection of object with similar type

Answer

- a) False
- b) True

11) Write a class definition that creates a class called leverage with one private data member, crowbar, of type int and one public function whose declaration is void pry(). **(4 Marks)**

Answer

```
class leverage
{
private:
int crowbar;
public:
void pry();
};
```

12) Write a Java program to print 'Hello' on screen and then print your name on a separate line. Using input from the user **(6 Marks)**

Answer

```
import java.util.Scanner;
public class Main {
    public static void main(String[] args)
    {
        Scanner input = new Scanner (System.in);

        System.out.print("Input your first name: ");
        String fname = input.next();
        System.out.print("Input your last name: ");
        String lname = input.next();
        System.out.println();
        System.out.println("Hello \n"+fname+" "+lname);}}
```

13) You are browsing a website on the internet while the speed is okay and suddenly you find that the page is loading slowly. Investigate the reason behind slowness? **(3 Marks)**

Answer

Causes: bad made cables, malfunctioning of network devices, wireless interference and weather.

SECTION B: ATTEMPT THREE QUESTIONS.

(30 Marks)

14) write a Java program to sort a numeric array and a string array. **(10 Marks)**

Answer

```
package arrayexercice;

import java.util.Arrays;

public class Exercise1 {

public static void main(String[] args){

    int[] my_array1 = { 17, 20, 18, 14, 13,14, 24, 54, 72, 23, 56, 21, 57, 56};

    String[] my_array2 = { "Java", "Python", "PHP", "C#", "C Programming", "C++" };

    System.out.println("Original numeric array : "+Arrays.toString(my_array1));

    Arrays.sort(my_array1);
```

```

System.out.println("Sorted numeric array : "+Arrays.toString(my_array1));
System.out.println("Original string array : "+Arrays.toString(my_array2));

Arrays.sort(my_array2);

System.out.println("Sorted string array : "+Arrays.toString(my_array2));  }}

```

- 14) Compare computerized vs non-computerized database with at least 5 for each. **(10 Marks)**

Answer

Computerized:

- Can hold a vast amount of data
- Very fast to find a specific record
- Can be used to analyze data
- Data can be sorted into ascending or descending order on multiple criteria
- Can easily update
- Records are stored safely; they are available when needed
- The database can be kept secure by use of passwords

Non computerized (paper based):

- Limited by physical storage space
- Difficult to search for a specific criteria
- Very difficult to analyze data
- Difficult to sort data on more than one criteria
- Records can be lost
- Difficult to make backup

- 16) Using a pointer write a C++ program which will ask the user to enter data and compute the area of a rectangle. Area = width*length. **(10 Marks)**

Answer

```

#include <iostream>

using namespace std;

int main()
{
int width,length,area,*p;
cout <<"\nenter the width";

```

```

cin>>width;
cout <<"\nenter the length";
cin>>length;
p = &width;
area = (*p) * length;
cout<<"The area of Rectangle is "<<area;

    return 0;
}

```

17) Build an application by using vb6.0 or vb.net to calculate the volume of the cylinder($V = \pi r^2 h$) **(10 Marks)**

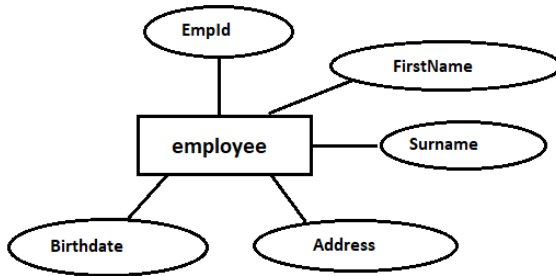
Answer

Vb6.0	Vb14
<pre> Private Sub Command1_Click() Label1.Caption = 3.14 * Val(Text1.Text ^ 2) * Val(Text2.Text) End Sub Private Sub Form_Load() Text1.Text = "" Text2.Text = "" Label1.Caption = "" End Sub </pre>	<pre> Public Class Form1 Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click Label3.Text = 3.14 * Val(TextBox1.Text ^ 2) * Val(TextBox2.Text) End Sub Private Sub Form1_Load(sender As Object, e As EventArgs) Handles MyBase.Load TextBox1.Clear() TextBox2.Clear() Label3.Text = "" End Sub End Class </pre>

18) a) Represent the employee relation in the conceptual model **(4 Marks)**

employees relation				
EmpId	FirstName	Surname	Address	Birthdate

Answer



b) The following table describes information about employees, study it and answer the following questions. **(6 Marks)**

EmpId	EmpSname	EmpFname	EmpLocation	EmpJobCode
1011	RUKUNDO	Jean Claude	Kigali	12
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- What is the possible domain for field EmpId?
- How many records are shown?
- How many attributes are shown?

Answer

- Domain of EmpId = {1011,1013,1014,1021}
- They are records 4 records
- They are 5 attributes

SECTION C: ATTEMPT ANY ONE QUESTION.

(15 marks)

19) Explain Elements of the Integrated Development Environment (IDE) in Visual basic **(15 Marks)**

Answer

- a. **Menu Bar:** It contains a standard command like: File, Edit, View, Window, Help menus, and specific command such as: Project, Format, or Debug menus.
- b- **Toolbar:** it contains the most commonly used commands (button), if clicked an action represented by that button is carried out.
- c- **ToolBox:** it contains a collection of tools that are needed for project design
- d- **Form Designer:** it is a window for each form to customize the designed interface of the application. Using the form designer, the user can add controls, graphics, and text to create the desired form appearance.
- e- **Properties Window:** it is a List of properties settings for a selected form or a control. These properties are characteristics (such as size, visible, or color) of the selected object it provides an easy way to set properties.
- f- **Project Explorer Window:** it is a list of the forms and modules for the current projects. It is a hierarchical tree- branch structure, where the project at top of tree and other parts like forms ,modules) descend from this tree.
- g- **Form Layout Window:** The Form Layout window is a small screen. Which is used to reposition the form of the application so that it appears in proper place when project is run.

h- **Code Editor Window:** Code Editor Window is used to write a VB code for an application. For each form there is a separate code editor window. It is displayed when user clicks on form or object in form.

20) Create a class student with the following specification **(15 Marks)**

Private members of class student:

admno integer

sname 20 character

eng. math, science float

total

float total() a function to calculate eng + math + science with float return type.

Public member function of class student

Takedata() Function to accept values for admno, sname, eng, science and invoke cttotal() to calculate total.

Showdata() Function to display all the data members on the screen.

Answer

```
#include<iostream>
using namespace std;
class student
{
private:
int admno;
char sname[20];
float eng,math,science;
float total;
float cttotal()
{
return eng+math+science;
}
public:
void Takedata()
{
cout<<"Enter admission number ";
cin>>admno;
cout<<"Enter student name " ;
cin>>sname;
cout<< "Enter marks in english, math, science ";
cin>>eng>>math>>science;
total=cttotal();
```



```
}
void Showdata()
{
cout<<"Admission number "<<admno<<"\nStudent name
"<<lname<<"\nEnglish " <<eng<<"\nMath "<<math<<"\nScience
"<<science<<"\nTotal "<<total;
}};
int main ()
{
student obj ;
obj.Takedata();
obj.Showdata();
return 0;
}
```

End !!!!