**MINISTRY OF EDUCATION ACADEMIC YEAR: 2020/2021**

**SOUTHERN PROVINCE PROMOTION: S6MCE&MPC**

**RUHANGO DISTRICT DATE: …. /….. /2021**

**DURATION: 3 HOURS TERM: III**

**COMPUTER SCIENCE EXAMINATION FOR MCE & MPC**

**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)**
	+ Do not use red pen.

**Section A:** Attempt **all** questions.

1. Define a computer. **(2marks)**
2. What is multimedia? **(2.5marks)**
3. Explain the different types of cybercrimes**. (3marks)**
4. Differentiate bubble sort with insertion sort. **(4marks)**
5. Mention some of the image formats used in multimedia? **(3marks)**
6. What is Throughput, Turnaround time, waiting time and Response time? **(4marks)**
7. On the basis of the conceptual structure how can the databases be classified? **(2.5 marks)**
8. Which of the following is not an example of system software? **(2 marks)**
a) Language Translator
b) Utility Software
c) Communication Software
d) Word Processors
9. What are the principle problems to be handled by the operating system’s memory management?

 **(2.5 marks)**

1. Differentiate between desktop application and web application. **(4 marks)**
2. Write a VB program using do while…loop to display number from 0 to 100. **(4 marks)**
3. Write java program to check whether the given number is positive or negative. **(5 marks)**
4. Write a pseudocode to swap two numbers in algorithm using third variable. **(4marks)**
5. What are the important topologies for networks? **(2 marks)**
6. What are the types of operating system available? **(5marks)**
7. How many types the Algorithm can be represented? **(2.5 marks)**
8. Explain the difference between FLOAT, DOUBLE and REAL? **(3marks)**

**Section B**: Attempt **three** questions.

1. Draw a flowchart for computing sum and average of five numbers. **(10 marks)**
2. Write a java program to get size of HashMap. **(10 marks)**
3. What are the directories under the apache-tomcat installation dir? Explain what is Jasper? **(10 marks)**
4. Write a C++ Program to illustrate default constructor, parameterized constructor and copy constructors. **(10 marks)**
5. Write a C++ Program to generate first n terms of Fibonacci sequence. **(10 marks)**

 **Section C:** attempt **any one** question.

1. Define the following terms:

Data, database, DBMS, database system, database catalog, program-data independence, user view, DBA, end user, canned transaction, deductive database system, persistent object, meta-data, and transaction processing application. **(15 marks)**

1. **Consider the following Entities and Relationships:**
**Country (con-code, name, capital)**
**Population (pop-code, population)**
**Country and Population are related with one-to-one relationship.**
**Constraints : Primary key and country name should not be null**
2. **Create a relation database. (5 marks)**
3. **Write queries of the following (10 marks)**
4. **Find the country details with lowest population.**
5. **List the name of countries whose population is between 50,00,000 and 70,00,000.**
6. **Find the population of ‘Rwanda’.**
7. **Display the country details in descending order of population.**

END

**MINISTRY OF EDUCATION TERM: III 2020/2021**

**SOUTHERN PROVINCE PROMOTION: S6MCE&MPC**

**RUHANGO DISTRICT**

**COMPUTER SCIENCE MARKING GUIDE FOR MCE & MPC**

 **Section A: Attempt all questions.**

1. **Define a computer. /2marks**

Answer:

A computer is an electronic device capable of receiving raw facts (*data*) and performing a sequence of operations on the data based on special computer instructions (*processing)* to produce desired output (*information*).

1. **What is multimedia? /2.5marks**

Answer:

Multimedia is a technique that incorporates text, graphics, sound, animations and video elements.

1. **Explain the different types of cybercrimes. /3marks**

Answer:

* Cyber bullying is bullying that takes place using electronic technology
* Sexting is the sending and receiving of text, photo or video messages of children and young people that are inappropriate and sexually explicit.
* “Grooming” is the way sexual predators get from bad intentions to sexual exploitation. Basically, grooming is manipulation. It’s the process pedophiles use to get children they target online to meet with them offline, the simple goal being sex
1. **Differentiate bubble sort with insertion sort. /4marks**

Answer:

Bubble Sort is a simple-minded algorithm based on the idea that we look at the list, and wherever we find two consecutive elements out of order, we swap them. This is done as follows: Repeatedly traverse the unsorted part of the array by comparing consecutive elements, and interchange them when they are out of order. While The Insertion Sort is a comparison based algorithm that builds a final sorted array one element at a time. It iterates through an input array and removes one element per iteration, finds the place if the element belongs in the array, and then places it there.

1. **Mention some of the image formats used in multimedia? /3marks**

Answer:

Some of the image formats used in multimedia are: GIF files, JPG files, Animated GIF files, MPEG files, Shockwave files and Nx View files.

1. **What is Throughput, Turnaround time, waiting time and Response time? / 4marks**

Answer:

Throughput: number of processes that complete their execution per time unit.

Turnaround time: amount of time to execute a particular process.

Waiting time: amount of time a process has been waiting in the ready queue.

Response time: amount of time it takes from when a request was submitted until the first response is produced, not output (for time-sharing environment).

1. **On the basis of the conceptual structure how can the databases be classified? /2.5 marks**

Answer:

Based on the conceptual structures, the databases can be classified as follows:

* Flat File database
* Relational database
* Hierarchical database
* Network database
* Object Oriented database
1. **Which of the following is not an example of system software? / 2 marks**
**a) Language Translator
b) Utility Software
c) Communication Software
d) Word Processors**

**Answer: d**
Explanation: A system software is responsible for controlling the operations of a computer system. Word Processor is an application software since it is specific to its purpose.

1. **What are the principle problems to be handled by the operating system’s memory management? / 2.5 marks**

Answer:

* To provide the memory space to enable several processes to be executed at the same time.
* To provide a satisfactory level of performance (process execution speed) for the system users.
* To protect each process from each other.
* Where desired, to enable sharing of memory space between processes.
* To make at the addressing of memory space as transparent as possible for the programmer.
1. **Differentiate between desktop application and web application. /4 marks**

Desktop applications

They must be developed for and installed on a particular operating system.

Have strict hardware requirements that must be met to ensure that they function correctly.

Updates to the applications must be applied by the user directly to their installation and may require hardware upgrades or other changes in order to work.

Web applications

A web application is any computer program that performs a specific function by using a web browser. The user accesses the application using the web browser and works with resources available over the internet, including storage and CPU processing power.

1. **Write a VB program using do while…loop to display number from 0 to 100. /4 marks**

Answer:

Private Sub Form\_Load()

Form1.Show

Dim num As Integer

num = 0

Do While num <= 100

num = num + 1

print num

Loop

End Sub

1. **Write java program to check whether the given number is positive or negative. /5 marks**

Answer:

import java.util.Scanner;

public class PositiveNegative

{

public static void main(String[] args)

{

int number;

Scanner scan = new Scanner(System.in);

System.out.print("Enter the number you want to check:");

number = scan.nextInt();

if(number >0)

{

System.out.println(number+" is positive number");

}

else if(number < 0)

{

System.out.println(number+" is negative number");

}

Else

{

System.out.println(number+" is neither positive nor negative");

}}}

1. **Write a pseudocode to swap two numbers in algorithm using third variable. / 4marks**

Answer:

BEGIN

SET Variable\_A, Temporary, Variable\_B

SET variable\_A=0; Temporary=0; Variable\_B=0

PRINT “Please enter Variable\_A”

 READ Variable\_A;

PRINT “Please enter Variable\_B”

READ Variable\_B

 Temporary = Variable\_A;

Variable\_A=Variable\_B;

Variable\_B=Temporary;

PRINT Variable\_A,Variable\_B;

END

1. **What are the important topologies for networks? /2 marks**

Answer:

* BUS topology
* STAR topology
* RING topology
* MESS topology
1. **What are the types of operating system available? / 5marks**

Answer:

The various operating systems are

1. Single user operating system
2. Multi user operating system
3. Time sharing operating system
4. Virtual storage operating system
5. Real time operating system
6. Multiprocessing operating system
7. Virtual machine operating system
8. Batched operating systems
9. Distributed operating systems
10. Network operating systems
11. **How many types the Algorithm can be represented? / 2.5 marks**

Answer:

The Algorithm can be represented into following ways

1. Normal English
2. Program
3. Flowchart
4. Pseudocode
5. Decision table
6. **Explain the difference between FLOAT, DOUBLE and REAL? /3marks**

Answer:

FLOATs store floating point numbers with 8 place accuracy and take up 4 bytes. DOUBLEs store floating point numbers with 16 place accuracy and take up 8 bytes. REAL is a synonym of FLOAT for now.

Section B: Attempt **three** questions.

1. **Draw a flowchart for computing sum and average of five numbers. / 10 marks**

**Answer:**

 

1. **Write a java program to get size of HashMap. / 10 marks**

Answer:

import java.util.\*;

 public class HashMapSizeExample {

public static void main(String args[]) {

 // Creating a HashMap of int keys and String values

HashMap<Integer, String> hashmap = new HashMap<Integer, String>();

// Adding Key and Value pairs to HashMap

hashmap.put(11,"Apple");

hashmap.put(22,"Banana");

hashmap.put(33,"Mango");

hashmap.put(44,"Pear");

 hashmap.put(55,"PineApple");

 System.out.println("Size of HashMap : " + hashmap.size());

}

}

**Output**
Size of HashMap : 5

1. **What are the directories under the apache-tomcat installation dir? Explain what is Jasper? / 10 marks**

**Answer:**

directories under the apache-tomcat installation dir are:

Conf, logs, shared, web-apps, work, temp

Explain what is Jasper?

* Jasper is a Tomcat’s JSP (Java Server Pages) engine
* It parses JSP files to compile them into JAVA code as servlets
* At runtime, Jasper allows to automatically detect JSP file changes and recompile them.
1. **Write a C++ Program to illustrate default constructor, parameterized constructor and copy constructors. /10 marks**

Answer:

Program:

#include<iostream>

Using namespace std;

 class code {

 int id;

 int count;

 public:

code()

{

 cout<<"Default constructor called\n";

 id=0;

cout<<"id="<<id<< endl;

}

code(int a)

{

cout<<"Parameterized constructor called\n";

 id=a;

cout<<"id="<<id<< endl;

}

code(code&x )

 {

cout<<"copy constructor called\n";

 id=x.id;

 cout<<"id="<<id<<endl;

}

void display()

{

cout<<"id="<<id<<endl;

}

~code()

{

cout<<"Object Destroyed"<<endl;

}

};

int main()

{

code a(100); // calls parameterized constructor

code b(a); // calls copy constructor

code c(a); // calls copy constructor

code d; //calls default constructor

cout<< “\n For object d id=”; d.display();

cout<< “\n For object a id=”; a.display();

cout<< “\n For object b id=”; d.display();

cout<< “\n For object c id=”; d.display();

return 0;

}

1. **Write a C++ Program to generate first n terms of Fibonacci sequence. / 10 marks**

**Answer:**

#include<iostream.h>

void fib(int n)

{

int f0,f1,f,count=0;

 f0=0;

f1=1;

while(count<n)

{

cout<<f0<<"\t";

count++;

f=f0+f1;

f0=f1;

 f1=f;

}

}

int main()

{

int terms;

cout<<"Enter How many terms to be printed:";

cin>>terms;

fib(terms);

return 0;

}

**Input:**

Enter How many terms to be printed:10

**Output:**

0 1 1 2 3 5 8 13 21 34

 Section C: attempt **any one** question.

1. Define the following terms:

Data, database, DBMS, database system, database catalog, program-data independence, user view, DBA, end user, canned transaction, deductive database system, persistent object, meta-data, and transaction processing application. /15 marks

Answer:

**Data:** Data is raw, real and known facts that can be stored and interpreted with some implicit meanings. Ex-name, age, class.

**Database:** A collection of related data, which is logically organized and designed to service some certain enterprise. A Database is a collection of related data with an implicit meaning.

**DBMS**: A database management system is a software system that helps users to create and maintains a database. This system contains the processes of defining, constructing, manipulating and sharing databases from various users and applications. DBMS: A software package to manage and maintain the database.

**Database system**: The DBMS and the data itself, sometimes with application programs. Database system is nothing but **database and DBMS software** together we call as **database system**.

**Database catalog**: Database catalog contains information such as the structure of each file, the type and storage format of each data item and various constraints on the data.

**Program-data independence**: The structure of data files is stored in the DBMS catalog separately from the access programs is known as program – data independence.

**User view**: It is the view that may be a subset of the database or it contains virtual data is derived from the database files but is not explicitly stored.

**DBA**: Database Administrator is an administrator who is responsible for authorizing access to the database. DBA manages and coordinates the resources and acquires software and hardware resources.

**End-user**: An end user is a person whose job requires access to the database for querying, updating and generating the reports.

**Canned transaction**: The main aim of canned transaction is using standard types of queries and updates for querying and updating database.

**Deductive database systems**: This type of database systems provides capability for defining deduction rules for new information from the stored database.

**Persistent object**: Persistent means object is stored permanently in an object –oriented DBMS and it survives to terminate the program execution and then retrieved directly by another program.

**Meta-data**: It is information about structure of each file, type and storage format of each data and various constraints on the data is called meta-data.

**Transaction-processing application**: This application is designed to maintain database integrity in a known, consistent state.

Transaction processing application also is a logical unit of database the processing includes one or more database operation like, insertion, deletion, modification and retrieve.

1. **Consider the following Entities & Relationships**
**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**
2. **Create a relation database. /5 marks**
3. **Write queries of the following: /10 marks**
4. **Find the country details with lowest population.**
5. **List the name of countries whose population is between 50,00,000 and 70,00,000.**
6. **Find the population of ‘Rwanda’.**
7. **Display the country details in descending order of population.**

**answer:**

/\* Creating country table \*/

CREATE TABLE COUNTRY (CON\_CODE NUMBER PRIMARY KEY,
NAME VARCHAR(20) NOT NULL ENABLE,
CAPITAL VARCHAR(20) );

/\* Creating population table \*/
CREATE TABLE POPULATION ( POP\_CODE NUMBER PRIMARY KEY,
POPULATION NUMBER ) ;

1. Find the country details with lowest population.
select country.con\_code,name,capital
from country, Population
where country.con\_code=population.pop\_code and Population.Population=(select min(population) from population );
2. List the name of countries whose population is between 50,00,000 and 70,00,000.
select name
from population, country
where population>=5000000 and
population<=7000000 and
country.con\_code=population.pop\_code;
3. Find the population of ‘Rwanda’.
select population
from population,country
where name=**‘Rwanda’** and country.con\_code=population.pop\_code;
4. Display the country details in descending order of population.
select name, country.con\_code,capital,population
from country,population
where country.con\_code=population.pop\_code
order by population.population desc;

 END