END OF TERM III EXAMINATIONS QUESTION PAPER

GRADE: SENIOR FIVE (S5)

LEVEL: ADVANCED LEVEL

COMBINATIONS: -MATHEMATICS -COMPUTER SCIENCE-ECONOMICS **(MCE)**

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

DURATION: 3HOURS

MARKS: ..../100   **CAMIS**   .... /70

INSTRUCTIONS

1)This paper consists of three sections.

Section A: Attempt **all 12** questions.   **(55marks)**

Section B: Attempt **3** questions.   **(30marks)**

Section C: Attempt **1** question.   **(15marks)**

2)Use a **blue or black ink pen only** to write your answers.

Section A: **Attempt all 12 questions from this section**   **(55marks)**

1. Choose the correct answer, what is the most important safety precaution to take when cleaning a laptop?   **(3 marks)**

     a) Use harsh chemicals.

     b) Power it off and unplug it.

     c) Clean while it's running.

     d) Don't worry about safety precautions.

2. Distinguish clearly between half-duplex and full-duplex in the context of data transmission.   **(6 marks)**

3. Discuss any 3 Database models.   **(6 marks)**

4. Define many to one relationship and give an example.   **(5 marks)**

5. Explain how functional dependency differ from transitive dependency in database normalization   **(5 marks)**

6. Differentiate between a class and an object in C++ with examples. **(5 marks)**

7. List any 5 basic Object Oriented Programming concepts.   **(5 marks)**

8. Define the term debugging   **(4 marks)**

9. What function is used to find the length of a string in Visual Basic?   **(3 marks)**

     a) Len()
     b) Length()
     c) StrLength()
     d) StringLength()

10.   Define method overloading and give an example.   **(5 marks)**

11.   When running a Java program with multiple classes, how does the Java Virtual Machine (JVM) identify the main class?   **(4 marks)**

  A) By searching for the class with the highest number of methods
  B) By searching for the class with the shortest name

C) By using the class specified with the -cp option

D) By using the class specified with the public static void main(String[] args)

        method

12.   What is the purpose of the "new" keyword in Java?   **(4 marks)**
   A) It creates a new class definition.
   B) It allocates memory for a new object.
   C) It initializes instance variables within a class.
   D) It defines a new method in a class.

Section B: Attempt any (3) three questions from this Section   (30marks)

13. Write a C++ Program to find the Fibonacci series up to a given term.
                                                                  (10 marks)

14. Analyse the program given below and give its output appropriately.
                                                                  (10 marks)

```cpp
#include <iostream>
int main() {
int arr[5] = {10, 20, 30, 40, 50};

    int *ptr = &arr[4];
 std::cout << "Elements of the array accessed using pointer:\n";

    for (int i = 0; i < 5; ++i) {
std::cout << "Element " << sizeof(arr)/sizeof(int)-i << ": " << *(ptr-i) << std::endl;

    }
std::cout << "\nModified elements of the array using pointer:\n";

    for (int i = 4; i >=0; i--) {
       *(ptr-i) += 5;
std::cout << "Element " << 5-i << ": " << arr[4-i] << std::endl;

    }
    return 0;
}
```

15. Consider the following declarations and answer the questions given
     below: **(10 marks)**

```cpp
class living_being {

 char name[20];

protected:

 int jaws; public:

 void inputdata(char, int);

 void outputdata(); }
```

class animal: protected living_being {

int tail;

 protected:

 int legs;

public:

 void readdata(int, int);

void writedata();

 }; class cow: private animal { char horn_size;

 public: void fetchdata(char); void displaydata(); };

(i) Name the base class and derived class of the class animal.

(ii) Name the data member(s) that can be accessed from function displaydata.

(iii) Name the data member(s) that can be accessed by an object of cow class.

(iv) Is the member function outputdata accessible to the objects of animal class.

16.   Using label and textbox Write a VB program to calculate cube of an entered number. you should use vb6.0 or vb.net   **(10 marks)**

17.   Write Java program that uses an array to calculate the sum of the first 20 numbers.   **(10 marks)**

Section C: Attempt any (1) one question from this Section   (15marks)

18.   Write a program in Visual Basic that calculate a factorial of a number
       received through input box and displays the result in a message box. You
       should use vb6.0 or vb.net.   **(15 marks)**

19.   Write a Java program that reads data from a file named "source.txt"
       using FileInputStream and writes it to a file named "destination.txt"
       using FileOutputStream.   **(15 marks)**

20.   Observe the IP address192.168.2.143/22 and respond to the
       questions below: **(15 marks)**
        a. What class does it belong
         b. Write down the network id and host id of the above IP
         address c. Which subnet mask does the network above have?
         d. How many bits reserved to network?
         e. How many hosts does the network above host?

COMPUTER SCIENCE

Date: 14/ 06/2024
Period: 8:30 -11:30

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END OF TERM III EXAMINATIONS MARKING GUIDE

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Section A: **Attempt all 12 questions from this section** (55marks)

1. Choose the correct answer, what is the most important safety precaution to take when cleaning a laptop? **(3 marks)**

    a) Use harsh chemicals.

    b) Power it off and unplug it.

    c) Clean while it's running.

    d) Don't worry about safety precautions.

    Answer

    b) Power it off and unplug it.

2. Distinguish clearly between half-duplex and full-duplex in the context of data transmission. **(6 marks)**

    Answer

Half-Duplex: the channel of communications allows alternating transmission in two directions, but not in both directions simultaneously

both

direction but not the same times

Example:
- Talkie- Walkie
- intercom,
- string phone

Full-Duplex: the communication between sender and receiver can occur simultaneously.   or data flows in both directions at the same time.

both

direction at the same times

Example:

- telephone conversation

3. Discuss any 3 Database models. **(6 marks)**

    Answer

    The hierarchical model organizes its data using a tree structure. The root of the tree is the parent followed by child nodes. The hierarchical model

was widely used in the early days of computing, but it has since been replaced by more flexible models such as the relational model.

In the network model, entities are organized in a graph, in which some entities can be accessed through several paths. The network model is an extension of the hierarchical model, where each child node can have multiple parent nodes.

In the Relational Model, data is organized in two-dimensional tables called relations.

The tables or relation are related to each other. The relational model is the most widely used database model.

4. Define many to one relationship and give an example.   **(5 marks)**
   Answer

In a many-to-one relationship, multiple entities or records from one entity can be associated with a single entity or record from another entity.

For example, in a customer and orders scenario, a customer can place multiple orders, but each order is associated with only one customer. Therefore, the relationship between a customer and orders is a many-to-one relationship

5. Explain how functional dependency differ from transitive dependency in database normalization   **(5 marks)**
   Answer

Functional Dependency:

Definition: Functional dependency describes a relationship between two attributes (or sets of attributes) in a relation such that one attribute's value determines another attribute's value.

Implication: Functional dependency is a fundamental concept used in normalization to identify and eliminate redundancy in a relation.

Transitive Dependency:

Definition: Transitive dependency occurs when a non-key attribute in a relation is functionally dependent on another non-key attribute rather than on a candidate key.

Implication: Transitive dependency violates the second normal form (2NF) in database normalization.

6. Differentiate between a class and an object in C++ with examples. **(5 marks)**

   Answer
   A class is a template for creating objects, whereas an object is an instance of a class. For example, "Car" is a class, and "BMW" or "Toyota" are objects of the "Car" class.

7. List any 5 basic Object Oriented Programming concepts.   **(5 marks)**
   Answer

   Classes.

   Objects

   Encapsulation

   Abstraction

   Inheritance

   Polymorphism

   Interfaces

8. Define the term debugging   **(4 marks)**

   Answer

Debugging is the process of identifying, isolating, and fixing errors or bugs in computer software or hardware. The goal of debugging is to ensure that the program runs as intended and produces the expected output without errors or unexpected behavior.

9. What function is used to find the length of a string in Visual Basic?
                                                                (3 marks)

   a) Len()
   b) Length()
   c) StrLength()
   d) StringLength()
       answer
   a) Len()

10. Define method overloading and give an example. **(5 marks)**
    Answer

Method overloading is a feature in object-oriented programming where a class can have multiple methods with the same name but with different parameters or arguments. In method overloading, the methods must have the same name but can differ in the number, order, or type of parameters.

Here is an example of method overloading in Java:

public class Calculator {

public int add(int num1, int num2) {

 return num1 + num2; }

public double add(double num1, double num2) {

return num1 + num2; }

 public int add(int num1, int num2, int num3) {

return num1 + num2 + num3; }}

11. When running a Java program with multiple classes, how does the Java Virtual Machine (JVM) identify the main class? **(4 marks)**

  A) By searching for the class with the highest number of methods
  B) By searching for the class with the shortest name
  C) By using the class specified with the -cp option

  D) By using the class specified with the public static void main(String[] args)

        method

        Answer

D) By using the class specified with the public static void main(String[] args) method

12. What is the purpose of the "new" keyword in Java? **(4 marks)**
  A) It creates a new class definition.
  B) It allocates memory for a new object.
  C) It initializes instance variables within a class.

D) It defines a new method in a class.

      Answer

B) It allocates memory for a new object.

Section B: Attempt any (3) three questions from this Section (30marks)

13.   Write a C++ Program to find the Fibonacci series up to a given term.

(10 marks)

Answer

```cpp
#include<iostream>
using namespace std;
main()  {
  int n, c, first = 0, second = 1, next;
  cout << "Enter the number of terms of Fibonacci series you want" <<
endl;
  cin >> n;

  cout << "First " << n << " terms of Fibonacci series are :" << endl;

  for ( c = 0 ; c < n ; c++ )    {
    if ( c <= 1 )
   next = c;
    else
  {
    next = first + second;
    first = second;
    second = next;
  }
    cout << next << endl;
  }
    return 0;
  }
```

14.   Analyse the program given below and give its output appropriately.

(10 marks)

```cpp
#include <iostream>
int main() {
int arr[5] = {10, 20, 30, 40, 50};
```

```cpp
    int *ptr = &arr[4];
 std::cout << "Elements of the array accessed using pointer:\n";

    for (int i = 0; i < 5; ++i) {
std::cout << "Element " << sizeof(arr)/sizeof(int)-i << ": " << *(ptr-i) << std::endl;

    }
std::cout << "\nModified elements of the array using pointer:\n";

    for (int i = 4; i >=0; i--) {
       *(ptr-i) += 5;
std::cout << "Element " << 5-i << ": " << arr[4-i] << std::endl;

    }
    return 0;
}
```
Answer

```
Elements of the array accessed using pointer:
Element 5: 50
Element 4: 40
Element 3: 30
Element 2: 20
Element 1: 10

Modified elements of the array using pointer:
Element 1: 15
Element 2: 25
Element 3: 35
Element 4: 45
Element 5: 55
```

15.   Consider the following declarations and answer the questions given
    below: **(10 marks)**

class living_being {

 char name[20];

protected:

 int jaws; public:

 void inputdata(char, int);

void outputdata(); }

class animal: protected living_being {

int tail;

protected:

int legs;

public:

void readdata(int, int);

void writedata();

}; class cow: private animal { char horn_size;

public: void fetchdata(char); void displaydata(); };

(i) Name the base class and derived class of the class animal.
(ii) Name the data member(s) that can be accessed from function displaydata.
(iii) Name the data member(s) that can be accessed by an object of cow class.
(iv) Is the member function outputdata accessible to the objects of animal class.

Answer

(i) Base class: living_being Derived class: cow

(ii) horn_size, legs, jaws

(iii) fetchdata() and displaydata()

(iv) No

16.   Using label and textbox Write a VB program to calculate cube of an entered number. you should use vb6.0 or vb.net   **(10 marks)**

Answer

Vb6.0	Vb.net
Private Sub Command1_Click() Dim a As Integer Dim result As Integer a = Val(Text1.Text) result = a * a * a Label1.Caption = result End Sub	Public Class Form1 Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click Dim a As Integer Dim result As Integer a = Val(TextBox1.Text) result = a * a * a Label1.Text = result End Sub End Class

17.   Write Java program that uses an array to calculate the sum of the first 20 numbers.   **(10 marks)**

        Answer

```java
public class SumOfFirst20Numbers {

public static void main(String[] args) {

int[] numbers = new int[20];

int sum = 0;

for (int i = 0; i < 20; i++) {

numbers[i] = i + 1; }

for (int i = 0; i < 20; i++) {

sum += numbers[i]; }

System.out.println("The sum of the first 20 numbers is: " + sum); }}
```

Section C: Attempt any (1) one question from this Section   (15marks)

18.   Write a program in Visual Basic that calculate a factorial of a number received through input box and displays the result in a message box. You should use vb6.0 or vb.net.   **(15 marks)**

VB 6.0	VB.net

Private Sub Form_Load()
 	
      Dim n As Integer
 	
      Dim fact As Long
 	
      fact = 1
 	
n = InputBox("enter a number here:", "Input Menu")
 	
      For i = 1 To n
 	
         fact = fact * i
 	
      Next
 	
MsgBox (n & "!=" & fact)
 	
   End Sub
	Public Class Form1
	
	   Private Sub Form1_Load(sender As Object, e As EventArgs) Handles MyBase.Load
	
	      Dim n As Integer
	
	      Dim fact As Long
	
	      fact = 1
	
	      n = InputBox("enter a number here:", "Input Menu")
	
	      For i = 1 To n
	
	         fact = fact * i
	
	      Next
	
	   MsgBox(n & "!=" & fact)
	
	      End Sub
	
	End Class

19.   Write a Java program that reads data from a file named "source.txt" using FileInputStream and writes it to a file named "destination.txt" using FileOutputStream.   **(15 marks)**

```java
        Answer
  import java.io.*;
    public class Filecopy {
```

```java
public static void main(String[] args) {
    // Step 1: Define the input and output filepaths
    String sourceFile = "source.txt";
    String destinationFile = "destination.txt";
    // Step 2: Create FileInputStream and FileOutputStream objects
    try (FileInputStream inputStream = new
FileInputStream(sourceFile);
        FileOutputStream outputStream = new
FileOutputStream(destinationFile)) {
        // Step 3: Read data from the source file and write it to the
destination file
        int data;
        while ((data = inputStream.read()) != -1) {
outputStream.write(data); }
// Step 4: Display a message indicating successful copy
        System.out.println("File copied successfully!");
    } catch (IOException e) {
        // Step 5: Handle any exceptions that may occur during file
operations
        e.printStackTrace();
    }
  }
}
```

20. Observe the IP address192.168.2.143/22 and respond to the questions below: **(15 marks)**

 a. What class does it belong

  b. Write down the network id and host id of the above IP address

  c. Which subnet mask does the network above have?

  d. How many bits reserved to network?

  e. How many hosts does the network above host?

Answer

a. IT BELONG TO CLASS C
b. NETWOR ID: 192.168.2   HOST ID 143
c. SUBNET MASK 255.255.252.0
d. 22 bits
e. HOSTS: 210-2=1022 HOSTS