

## Computer Science

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



## END OF TERM III EXAMINATIONS

**LEVEL:** Advanced Level, S4

**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) What are the different Operating Systems used in computer? **(4 Marks)**

2) Develop html code that displays the following page: **(4 Marks)**

3) The HTML elements (Tags) can be classified as two types:

(1) Container elements, (2) Empty elements. Discuss on them and give an example. **(4 Marks)**

4) Distinguish between an algorithm and a process. **(4 Marks)**

5) Solve the following number system: **(8 Marks)**

a) Convert  $(1056)_{16}$  to octal number.

b) Convert  $(1001001100)_2$  to decimal number.

c) Convert  $10101_2$  into an octal number.

d) Convert hexadecimal 2C to decimal number.

6) Determine the role of Disk cleanup **(3 Marks)**

7) What is computer ergonomics? **(3 Marks)**

8) Discuss on functions of system software **(4 Marks)**

9) Define an Array? What are the types? **(4 Marks)**

10) What is the difference between “Run time error” and “Syntax error”? **(4 Marks)**

11) Explain the advantages of cascading style sheet. **(4 Marks)**

12) Explain how you would connect both data projector and monitor to a single computer. **(4 Marks)**

13) What is selection statement? write it's types? **(5 Marks)**

**SECTION B: ATTEMPT THREE QUESTIONS.**

**(30 Marks)**

- 14) Make comparison between fourth and fifth generation of computers. **(10 Marks)**
- 15) Draw flowchart to find area of a rectangle **(10 Marks)**
- 16) Write a C++ program that allows the user to enter marks for three subject. The program should calculate, then display the total and mean score of the three subjects. **(10 Marks)**
- 17) Write C++ programs to interchange the values of two variables. **(10 Marks)**
- 18) Write a function called zeroSmaller() that is passed two int arguments by reference then sets the smaller of the two numbers to 0. Write a main() program to exercise this function. **(10 Marks)**

**SECTION C: ATTEMPT ANY ONE QUESTION.**

**(15 marks)**

- 19) Explain the fundamental gates with expression and truth table. **(15 Marks)**
- 20) Write a C++ program to swap first and last element of an integer 1-d array. **(15 Marks)**

**End !!!**

**Computer Science**  
**MARKING GUIDE**



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**DURATION:**              **3 Marks**

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### **INSTRUCTIONS**

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<b>Section A:</b> Attempt <b>all</b> questions.	<b>(55 marks)</b>
<b>Section B:</b> Attempt <b>three</b> questions.	<b>(30 marks)</b>
<b>Section C:</b> Attempt <b>any one</b> question.	<b>(15 marks)</b>

**SECTION A: ATTEMPT ALL QUESTIONS.**

**(55 marks)**

- 1) What are the different Operating Systems used in computer? **(4 Marks)**

Answer

The different types of operating system used in the computer:

- (i) Single User and Single Task Operating Systems
- (ii) Multi User Operating Systems
- (iii) Multi Processing Operating Systems
- (iv) Distributed Operating Systems
- (v) Prominent Operating Systems

- 2) Develop html code that displays the following page: **(4 Marks)**

Answer

I am coming from ~~United Kingdom~~ Rwanda

Answer

```
<html>

<head>

<title> Inserting and Deleting text </title>

</head>

<body>

I am coming from <del> United Kingdom</del> <ins> Rwanda </ins>

</body>

</html>
```

- 3) The HTML elements (Tags) can be classified as two types: (1) Container elements, (2) Empty elements. Discuss on them and give an example.

**(4 Marks)**

Answer

Container Elements:

The tags which are required opening and closing is known as container elements

or tags. For example: <html>, <body>, <title>, <p> etc.,

Empty Elements:

The tags which are required only opening tag is known as empty elements or tags.

For example: <br>

4) Distinguish between an algorithm and a process. **(4 Marks)**

Algorithm:

(i) An algorithm is a step-by-step sequence of statements to solve a problem.

(iii) As an algorithm is executed, a process evolves which solves the problem.

Process:

(i) An instruction describes an action.

(ii) When the instructions are executed, a process evolves which accomplishes

the intended task or solves the given problem.

5) Solve the following number system: **(8 Marks)**

a) Convert  $(1056)_{16}$  to octal number.

b) Convert  $(1001001100)_2$  to decimal number.

c) Convert  $10101_2$  into an octal number.

d) Convert hexadecimal 2C to decimal number.

Answer

a)  $(4182)_{10} = (10126)_8$  Therefore,  $(1056)_{16} = (10126)_8$  **/2 marks**

b)  $(1001001100)_2 = (588)_{10}$  **/2 marks**

c)  $10101_2 = 25_8$  **/2 marks**

d)  $2C_{16} = 44_{10}$  **/2 marks**

6) Determine the role of Disk cleanup **(3 Marks)**

Answer

Disk clean-up utility can determine which files on hard drive may no longer be needed and delete those files. In addition to freeing up potentially significant amounts of hard drive space. Using this utility regularly can improve system performance.

7) What is computer ergonomics? **(3 Marks)**

Answer

The term ergonomic refers to applied science of equipment design with the purpose of optimizing productivity while minimizing discomfort and fatigue. Good organic furniture and equipment helps in preventing health related risks such as arthritis, backache and fatigue.

8) Discuss on functions of system software **(4 Marks)**

Answer

System software performs a variety of fundamental operations that avails computer

resources to the user. These functions include:

- Booting the computer and making sure that all the hardware elements are working properly.
- Performing operations such as retrieving, loading, executing and storing application programs.
- Storing and retrieving files.
- Performing a variety of system utility functions

9) Define an Array? What are the types? **(4 Marks)**

Answer

"An array is a collection of variables of the same type that are referenced by a common name".

There are different types of arrays used in C++. They are:

- (i) One-dimensional arrays
  - (ii) Two-dimensional arrays
  - (iii) Multi-dimensional arrays
- 10) What is the difference between "Run time error" and "Syntax error"? **(4 Marks)**

Answer

#### **Syntax error**

- (i) Syntax is a set of grammatical rules to construct a program.
- (ii) Syntax errors occur when grammatical rules of C++ are violated.
- (iii) **Example:** if a program tries to open a file which does not exist, it results in a run time error.

#### **Run-time error**

- (i) A run time error is that occurs during the execution of a program.
- (ii) It occurs because of some illegal operation that takes place.
- (iii) **Example:** if a program tries to open a file which does not exist, it results in a run time error.

- 11) Explain the advantages of cascading style sheet. **(4 Marks)**
- Answer

**Maintainability:** CSS are also defined and stored as separate files. So, the style and appearance of a web page can be dynamically changed and maintained with less effort.

**Reusability:** The styles defined in CSS can be reused in multiple HTML pages.



**Easy to understand:** The tags in web pages are well organized with style specifications and therefore it is easy to understand.

- 12) Explain how you would connect both data projector and monitor to a single computer. **(4**

**Marks)**

Answer

You should have a computer with two VGA ports; Or one VGA port and a HDMI port so that you can connect one device to the VGA and the other to the HDMI. Alternatively, if the computer does not have two ports, you need to buy a VGA adapter that matches the ports on your devices.

After you connect the devices:

- (i) Click the Start button, choose Settings, and click the System icon.
- (ii) When the System page appears, click the words Advanced Display Settings in the screen's bottom-right corner.

- 13) What is selection statement? write it's types? **(5 Marks)**

Answer

The selection statement means the statement(s) are executed depends upon a condition. If a condition is true, a true block (a set of statements) is executed otherwise a false block is executed. This statement is also called decision statement or selection statement because it helps in making decision about which set of statements are to be executed.

types are

- (i) if statement
- (ii) if-else statement
- (iii) nested if
- (iv) switch-case.

**SECTION B: ATTEMPT THREE QUESTIONS.****(30 Marks)**

- 14) Make comparison between fourth and fifth generation of computers.  
**(10 Marks)**

The fourth generation computers have the following features:

- a) These computers use LSI and VLSI technologies.
- b) Its sizes were reduced to desktop and laptop computer.
- c) These computers are highly reliable and accurate.
- d) They have a large memory and high functional speed.
- e) The operating speed is measured in beyond picoseconds and MIPS (Millions of instruction per second)
- f) Magnetic disk is the common source of external storage.
- g) Multiprocessing and multiprogramming OS (operating system) are used.
- h) 4GL are also used.

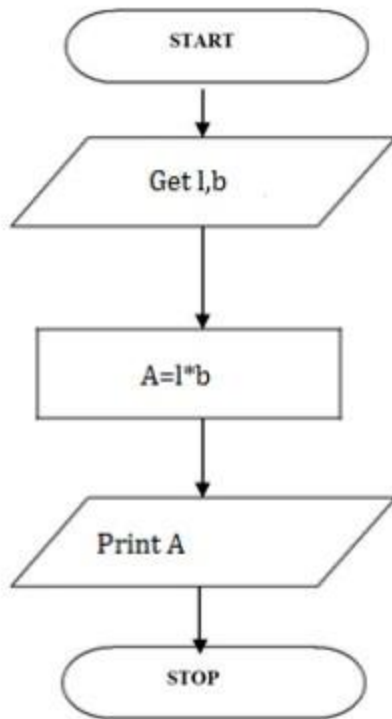
The examples are – IBM PC, Apple/Macintosh, 8086, 80286 SX, 80386 SX etc.  
The computers having artificial intelligence (AI) and high processing capacity.

Fifth generation computers have the features:

- a) The speed will be extremely high in fifth generation computer.
- b) These computers will be using Ultra Large Scale Integration (ULSI) technology.
- c) The goal of fifth generation computers is to develop machines that will be able to think and take decisions.
- d) It can perform large number of parallel processing.
- e) Biochips and Gallium Arsenide (GaAS) will be used as memory devices.
- f) large uses of natural language processing and user friendly.  
Able to make decisions like human beings.

- 15) Draw flowchart to find area of a rectangle  
Answer

**(10 Marks)**



- 16) Write a C++ program that allows the user to enter marks for three subject. The program should calculate, then display the total and mean score of the three subjects.

**(10 Marks)**

Answer

```
#include <iostream>
using namespace std;
int main()
{
float a, b, c, sum; double mean;
cout << "Enter 1st number:";
cin >> a;
cout << "Enter 2nd number:";
cin >> b;
cout << "Enter 3rd number:";
cin >> c;
```

```

    sum = a + b+c;
    mean = sum/3;
    cout << "Sum is:" << sum << endl;
    cout << "Mean is:" << mean << endl;
    return 0;
}

```

17) Write C++ programs to interchange the values of two variables. **(10 Marks)**

```

#include<iostream>
using namespace std;
int main ()
{
    int a, b, t;

    cout<<"\n Enter First number";

    cin>>a;

    cout<<"\n Enter Second number";

    cin>>b;

    t=a;

    a=b;

    b=t;

    cout<<a<<'\'t'<<b;

    return 0;

}

```

18) Write a function called zeroSmaller() that is passed two int arguments by reference then sets the smaller of the two numbers to 0. Write a main() program to exercise this function. **(10 Marks)**

### Answer

```
#include <iostream>
using namespace std;
int main()
{
    void zeroSmaller(int&, int&);
    int a=4, b=7, c=11, d=9;
    zeroSmaller(a, b);
    zeroSmaller(c, d);
    cout << "\na=" << a << " b=" << b
    << " c=" << c << " d=" << d;
    return 0;
}
void zeroSmaller(int& first, int& second)
{
    if( first < second )
        first = 0;
    else
        second = 0;
}
```

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

19) Explain the fundamental gates with expression and truth table.

**(15 Marks)**

Answer

A gate is basic electronic circuit, which operates on one or more signals to produce an output signal. There are three fundamental gates namely AND, OR and NOT.

**AND Gate :**

The AND gate can have two or more input signals and produce an output signal. In boolean algebra, a variable can take either of the values '0' or '1'. The logical symbol of the AND gate is

*Logic symbol of AND Gate*

In boolean algebra the multiplication sign stands for the AND operation. Therefore, the output of the AND gate is

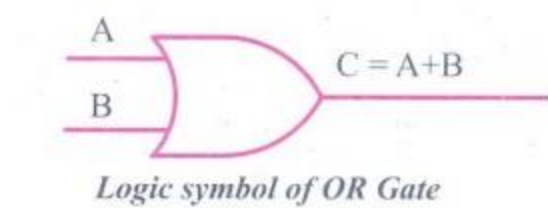
$$C = A \cdot B \text{ or simply } C=AB$$

The truth table for AND Gate is

Input		Output
A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

*The truth table for AND Gate**The truth table for AND Gate***OR Gate :**

The OR gate gets its name from the fact that it behaves like the logical inclusive "OR". The output is "true" if either or both of the inputs are "true". If both inputs are "false" then the output is "false". In other words the output will be 1 if and only if one or both inputs are 1; otherwise, the output is 0. The logical symbol of the OR gate is



*Logic symbol of OR Gate*

The OR gate output is

$$C = A \text{ OR } B$$

We use the + sign to denote the OR function.

Therefore,

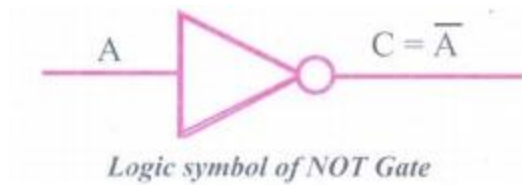
$$C = A + B$$

The truth table for OR gate is

Input		Output
A	B	C
0	0	0
0	1	1
1	0	0
1	1	1

### **NOT Gate :**

The NOT gate, called a logical inverter, has only one input. It reverses the logical state. In other words the output C is always the complement of the input. The logical symbol of the NOT gate is



*Logic symbol of NOT Gate*

The boolean function of NOT gate is

$$C = \text{NOT } A$$

In boolean algebra, the overbar stands for NOT operation. Therefore,  $C = \bar{A}$

The truth table for NOT gate is

Input	Output
A	C
1	0
0	1

20) Write a C++ program to swap first and last element of an integer 1-d array.

**(15 Marks)**

Answer

```
#include<iostream>
using namespace std;
int main()
{
    int Arr[100],n,i,temp;
    cout<<"Enter number of elements you want to insert ";
    cin>>n;
    for(i=0;i<n;i++)
    {
        cout<<"Enter element "<<i+1<<":";
```



```
        cin>>Arr[i];
    }
    temp=Arr[0];
    Arr[0]=Arr[n-1];
    Arr[n-1]=temp;
    cout<<"\nArray after swapping"<<endl;
    for(i=0;i<n;i++)
        cout<<Arr[i]<<" ";
    return 0;
}
```

**End !!!!**