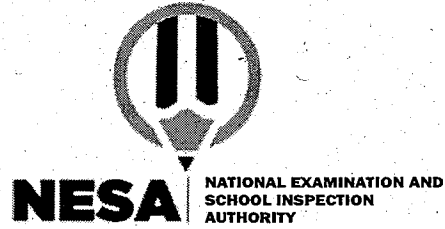


COMPUTER SCIENCE

016

26/07/2021 8.30 AM- 11.30 AM



ADVANCED LEVEL NATIONAL EXAMINATIONS, 2020-2021

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 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 **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) $(a+b)/(p+q)^2$

- 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)**

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

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

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 salary only and show the salary in ascending order. **(2 marks)**

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