| COMPUTER SCIENCE |
| 016 |
| 01/08/2022   8:30 AM- 11:30 AM |

NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2021-2022

SUBJECT: COMPUTER SCIENCE

COMBINATIONS:

- MATHS-COMPUTER SCIENCE-ECONOMICS **(MCE)**
- MATHS-PHYSICS-COMPUTER SCIENCE **(MPC)**

DURATION: 3 HOURS

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 only a **blue** or **black** pen.

SECTION A: ATTEMPT ALL QUESTIONS. (55 marks)

1) List the main characteristics of a computer. **(5 marks)**

2) Describe the differences between keywords and identifiers, and give an example. **(5 marks)**

3) What are the various formatting tags in HTML? Explain each. **(6 marks)**

4) Determine the output of the following program **(6 marks)**

```
#include <iostream>

using namespace std;

int main()

{ int n=44;

int& rn=n;

cout << "n = " << n << ", rn = " << rn << endl;

--n;

cout << "n = " << n << ", rn = " << rn << endl;

rn *= 2;

cout << "n = " << n << ", rn = " << rn << endl;

}
```

5) Illustrate some advantages of servlets. **(4 marks)**

6) Using if...else if statement, write the corresponding codes of the following program codes (suppose that they are embedded in vb6.0 or vb.net) **(6 marks)**

```
Dim Age As Integer
Age = Text1.Text


Select Case Age
Case 5
  lblCategory.caption = "Child of Five Years Old"
Case 13 To 19
  lblCategory.caption = "Teenager"
Case 20 To 35, 50, 60 To 65
  lblCategory.caption = "Special Adult"
Case Is > 65
  lblCategory.caption = "Senior Citizen"
Case Else
  lblCategory.caption = "Everyone Else"
End Select
```

7) Outline any four devices where Java can be used. **(2 marks)**

8) Analyze the program below and answer the questions that follow. **(5 marks)**

```
class district {
int num;
String name;
district()    {
System.out.println("Rwanda has 30 districts ");  }}

public class Learningactivity102 {
public static void main(String[] args) {

        district district1 = new district();

System.out.println(district1.name);
System.out.println(district1.num); }  }
```

a) What is the output of the above program?

b) Differentiate between district, district1 and district () used in above program.

9) Differentiate RDB from RDBMS. **(4 marks)**

10) Define the following terms used in computer security **(4 marks)**
   a) Computer security
   b) Threat

11) What are the advantages of protecting your wireless network with a password? **(3 marks)**

12) What does the term bandwidth mean? Give an example. **(3 marks)**

13) List four areas where computer graphics can be applied. **(2 marks)**

SECTION B: ATTEMPT THREE QUESTIONS. (30 marks)

14) Elaborate responsibilities and role of technician in computer repairing.

(10 marks)

15) Draw a flowchart to find the largest among three different numbers entered by user. **(10 marks)**

16) Using array write a java program to calculate sum and average of n numbers. **(10 marks)**

17) Study the table below and answer the queries that follow. **(10 marks)**

ACCOUNT

CustomerID	AccountNumber	AccountType	DateOpened	Balance
1001	9987	Checking	10/12/1989	4000.00
1001	9980	Savings	10/12/1989	2000.00
1002	8811	Savings	01/05/1992	1000.00
1003	4422	Checking	12/01/1994	6000.00
1003	4433	Savings	12/01/1994	9000.00
1004	3322	Savings	08/22/1994	500.000
1004	1122	Checking	11/13/1988	800.000

CUSTOMER

CustomerID	Names	Address	City	State	Zip
1001	Smith	123 Lexington	Smithville	KY	91232
1002	Jones	12 Davis Ave.	Smithville	KY	91232
1003	Axen	443 Grinder Ln.	Broadville	GA	81992
1004	Builder	661 Parker Rd.	Streetville	GA	81990

a) List all the details of customers. **(2 marks)**
b) List all the different account types. **(2 marks)**
c) Display all customers whose names contain the character "n".

(2 marks)
d) Find the total savings of all customers. **(2 marks)**
e) What will be sql code for the following output? **(2 marks)**

CustomerID	AccountNumber	AccountType	DateOpened	Balance
1003	4422	Checking	12/01/1994	6000.00
1004	1122	Checking	11/13/1988	800.000

18) Write a VB program that displays the multiplication table of 4 to 6. (You can use vb6.0 or vb.net) **(10 marks)**

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

19) Create a class called employee that contains a name (an object of class string) and an employee number (type long). Include a member function called getdata() to get data from the user for insertion into the object, and another function called putdata() to display the data. Assume the name has no embedded blanks.

Using C++ Write a main() program to exercise this class. It should create an array of type employee, and then invite the user to input data for up to 100 employees. Finally, it should print out the data for all the employees. **(15 marks)**

20) Suppose that the following processes arrive for execution at the times indicated. Each process will run the listed amount of time. In answering the questions, use _non-preemptive_ scheduling and base all decisions on the information you have at the time the decision must be made.

(15 marks)

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

a) What is the *average turnaround time* for these processes with the FCFS scheduling algorithm? **(5 marks)**

b) What is the *average turnaround time* for these processes with the SJF scheduling algorithm? **(5 marks)**

c) The SJF algorithm is supposed to improve performance, but notice that we chose to run process P1 at time 0 because we did not know that two shorter processes would arrive soon. Compute what *the average turnaround time* will be if the CPU is left idle for the first 1 unit and then SJF scheduling is used. Remember that processes P1 and P2 are waiting during this idle time, so their waiting time may increase. This algorithm could be known as future-knowledge scheduling. **(5 marks)**

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