

Field: COMPUTER ENGINEERING

Specialty: COMPUTER ENGINEERING

Option: SOFTWARE ENGINEERING

Exam Paper: PRACTICE OF COMPUTER

Credit value :8

Duration: 5 HOURS

NATURE OF EXAM: PRACTICAL

Code: SWE 20

2021-2022 SESSION

I. STRUCTURED PROGRAMMING AND DATA STRUCTURES

(C PROGRAMMING) 25MKS

1. An array is to be created to hold the following marks of a student on 20 for six (6) courses: 12.5, 15.0, 16.5, 11.5, 18.0, 9.5.
 - a) Create the above array and populate it with the data from the keyboard (real-time). Also display the content of the array on separate lines. (5 marks)

Observe student enter the data from the keyboard, observe content of array displayed on separate lines

- b) Create and call a function that swaps the first value with the last value in the array. The program should show the array before swapping and the array after swapping (9.5 becomes first on the list). (5 marks)

Observe that 9.5 is swapped with 12.5

- c) Create and call function that sorts the last four (4) values in the array in ascending order. The program must show the array before the sorting and after sorting (5 marks)

Observe that last the last 4 values are sorted.

2. Consider the following data:

RollNo	Name
21001	Terry
21002	Shirley
21003	Pericostigan
21004	Persis
21005	Wiiliam
21006	Jude
21007	Petra

You want to store this information in a file named registered.txt. Write a program that takes the above information from the keyboard and stores in the file on separate lines. The program should equally read the content of the file and display on the screen. (10 marks)

Observe to see the file register.txt, open to see the data in it. Let the content of the file be displayed on the screen.

3. The data in the table in question two (2) above can be stored using a linked list. Write a program that stores the above information in a linked list from the keyboard. Create functions to do the following on the created linked list (15 marks)
 - a) Display the content of the linked list.
 - b) Delete any record in the linked list. Display the linked list after delete to confirm record was deleted.

Observe to see values entered from the keyboard, content displayed as on the table, content after delete is short of one record.

II. OBJECT ORIENTED PROGRAMMING (C++ OR JAVA PROGRAMMING) 25MKS

Generally a bank account is identified by the persons' user name and a pin code. A user can either deposit, carry out a withdrawal, view his balance or change his pin code .

- 1- What is an abstract class? 2mk
- 2- State two characteristics of an abstract class 2mks
- 3- Create an abstract class called BankAccount containing three data fields – name(a string for the user name), pin(a string to store the pin code of the users in the class), amount (an integer for the amount of money stored in the account i.e. the account balance). Amount is the only private data field . create a getter and setter method for amount. Create virtual or abstract methods having the following names: deposit(name1, pin1, amt1) , withdrawal(name2, pin2, amt2), DisplayInfo(name3, pin3) and Change_pin(name4, oldpin, newpin) 3mks
- 4- Create a sub class of BankAccount called MyBankAccount and override the methods as follows: 2mks
- 5- Create a no argument constructor and initialize name="Ngong", pin="p". with the help of the getter or setter method, initialize amount to amount=0. 2mks
- 6- Create the deposit(name1, pin1, amt1) method which will permit the user to carry out a deposit. This method increases the account balance by amt1 and returns void. Pin1 name1 must be verified before this transaction takes place else the message "user name and pin code do not match" is displayed 2mks

- 7- Create the withdrawal(name2, pin2, amt2) method which permits the user to carry out a withdrawal . This will decrements the account balance by amt2 and returns void. Pin2 name2 must be verified before this transaction takes place else the message "user name and pin code do not march" is displayed **2mks**
- 8- Create the DisplayInfo(name3, pin3) which displays the name and current account balance. Pin3 name3 must be verified before this transaction takes place else the message "user name and pin code do not march" is displayed **2mks**
- 9- Create the Change_pin(name4, oldpin, newpin) which changes pin from oldpin to newpin. Oldpin, name4 must be verified before this transaction takes place else the message "user name and pin code do not march" is displayed **2mks**
- 10- Draw a class diagram to represent this situation **2mks**
- 11- In the main method, create an object of MyBankAccount class. Declare three variables to hold the name , pin code and the choice of the user. Prompt the user to enter the pin value and the name.
- Based on the user's choice, any of the MyBankAccount class method can be called using a switch statement. You can use the while statement to permit the user to continue doing transactions until he decides to quite
- NB All this should be done in a single program. Number your work in a comments **4mks**

SECTION B: Database Development and Administration (MySQL). (20marks)

A new school has just been created in town and they are about creating their data base using mysql. The school secretary recorded some information about new students enrolled to study some particular courses. The table also shows the courses with their respective course codes taken by each student

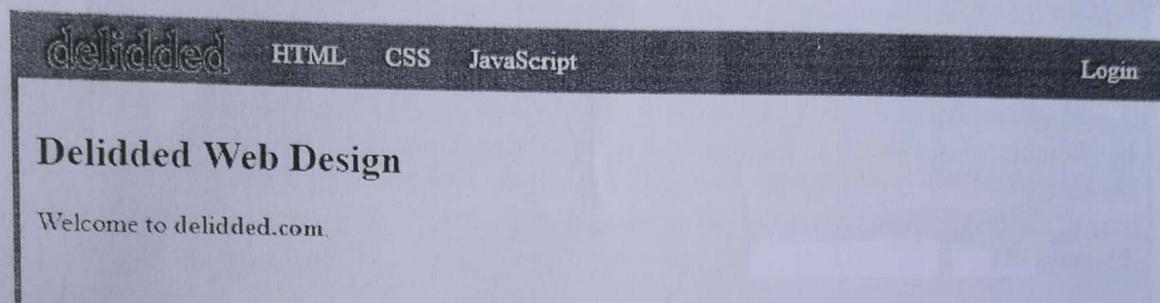
studentId	name	address	tel	age	CourseTitle	CourseCode
1	Tubuo	Carefou-obili	679200671	21	C programming database	PR111 DB112

2	Fotabe	omnisport	692056145 678889556 66990934	19	Web Analysis Data structures	PR113 AN113 DA114
3	Nabi	SNEC-EMIA	654151770	45	Web Database analysis	PR113 DB112 AN113
4	Chafa	Biamassi	677003311 69202567	41	Moral education	MO114

1. Arrange the table in the first 1NF 2mks
2. What is an anomaly? 1mk
3. Explain delete , update, insert anomaly as seen in the table in 1NF 3mks
4. Arrange the table in 2NF 2mk
5. Explain how the anomalies above have been resolved 3mks
6. Draw an ER diagram 2mks
7. Create the tables in MySQL server 1mk
8. Write queries that do the following
 - a. Display the names and the address of students whose ages are more than the average age 2mks
 - b. Display the names of all students offering web 2mks
 - c. Nabi has transferred to Kolbesong . Do the necessarily update. 2mks
 - d. A new student called Brandon just came. He leaves at Mbvogbetsi and has Tel 650677823. He has not yet decided which courses to be offering but has paid his registration fee. Add him in the database 1mk
 - e. Display the names of all students whose names end with a. 1mk

SECTION C: WEB PROGRAMMING. (15marks)

Consider the following web page below



- a. Use html5 and external css3 to create the page. The logo “delidded” can be replaced.
Add another link beside “javascript” at the navigation bar called “Registration”.
Include a footer with the right information. Whenever a mouse over on a link its color should change.
- b. create the form below and link it to the link registration created above in the web page

Lastname: [Text Input]

Course : Course ▾

Gender:

Male
 Female
 Other

Phone: +91 [Text Input]

Address [Text Area]

Email: [Text Input]

Password: [Text Input]

Re-type password: [Text Input]

c. [Submit Button]

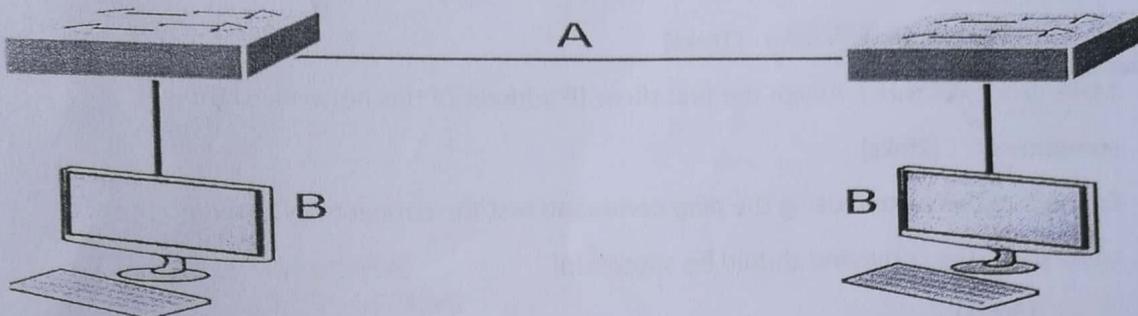
use a JavaScript function to validate that password and Re-type password is the same before the form is submitted

- d. Create a database called application, a php script to connect the form to the database , add the database *records from the form*

Section D: NETWORKING. (15marks)

Part A (5mks)

1. In the following diagram, identify the cable types required for connections A and B.



2. The cable used to connect to the console port on a router or switch is called a _____ cable
3. What is the maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.224 subnet mask?
4. You have a network that needs 29 subnets while maximizing the number of host addresses available on each subnet. How many bits must you borrow from the host field to provide the correct subnet mask?
5. Which two statements describe the IP address 10.16.3.65/23? (Choose two.) A. The subnet address is 10.16.3.0 255.255.254.0. B. The lowest host address in the subnet is 10.16.2.1 255.255.254.0. C. The last valid host address in the subnet is 10.16.2.254 255.255.254.0. D. The broadcast address of the subnet is 10.16.3.255 255.255.254.0. E. The network is not subnetted.

Part B (10mks)

Materials required:

- e. Three (3) computers equipped with NIC cards. Yours and that of your two neighbors.
- f. One (1) switch
- g. Three (3) twisted pair cables of 2meters each.
- h. RJ-45 Connectors
- i. Crimping tool
- j. Cable Tester

Let's consider the following IP address: 10.0.0.0 with the subnet mask: 255.255.0.0.

- 1- Using appropriate tools, crimp necessary cables for the exercise. (4mks)
- 2- Use a tester to test the crimp (1mks)
- 3- Make groups of three. Assign the first three IP address of this network to the computers. (2mks)
- 4- Connect to the switch. Using the *ping* command test the connectivity between the computers. The command should be successful.
(3mks)

National Exam of Higher National Diploma 2022 Session

Spécialty/option: Software Engineering (SWE)

Paper: Cass Study

Duration : 6 Hours

Credits : 14

GENERAL INSTRUCTIONS.

You are reminded of the necessity of good English and orderly presentation of your material. Where calculations are required, clearly show your working and be chronological in your answer.

SECTION A: ALGORITHM AND PROGRAMMING. (50MARKS)

I. Algorithms (10Marks)

- 1- Explain what is Space complexity of an algorithm means. (2marks)
- 2- An algorithm execution time can be said to be worst case, average case, or best case.
Define these notations **3x1=3marks**
- 3- Write an algorithm that receives three numbers and displays the maximum of these numbers using
 - i. Pseudocode
 - ii. Flowcharts (2.5x2=5marks)

II. Procedural Programming (20Marks)

- 1- A class of n students take an annual examination in m subjects. Two of such subjects are coefficient 4 subjects and the rest are coefficient 2. Mathematics and English are the two coefficient 4 subjects and they are compulsory. Each student must offer between 4 and 10 subjects. Write a c program that permits the user to
 - i. To enter the number of subjects written, marks on twenty and the coefficient of each of the subjects written.
 - ii. The program will print out the total marks of the student, his average and his remark (0<=average<=6: ver ypoor, 6<average<=9: poor, 9<average<10: belowaverage, average=10: average, average>10 :good (10marks)

- 2- Write a function named "location_of_target" that takes as its arguments the following:

 - (1) an array of integer values;
 - (2) an integer that tells how many integer values are in the array;
 - (3) an integer "target value".

The function should determine whether the given target value occurs in any of the cells of the array, and if it does, the function should return the subscript of the cell containing the target value. If more than one of the cells contains the target value, then the function should return the largest subscript of the cells that contain the target value.

If the target value does not occur in any of the cells, then the function should return the sentinel value -1. Thus, for example, if the target value that's passed to the function is 34 and the array that's passed to the function looks like this:

0	1	2	3	4	5	6
58	26	91	34	70	34	88

then the target value occurs in cells 3 and 5 , so the function should return the integer value 5.

(10marks)

III. Object oriented programming (20Marks)

- 1- Define the following as seen in object oriented programming.

 - Object
 - Classes
 - Methods **(3x1= 3marks)**

2- What are the four major principles that make a language to be object oriented? **(4marks)**

3- What are the differences between private and public class members? **(2marks)**

4- What are the differences between data hiding and encapsulation? **(2marks)**

5- Design a class called Cube that has the following data member side of data type double.
Supply the following methods: a constructor with one argument, a getter and setter
method for the side of the cube, the volume equals to side raised to the power three.

Implement the class Cube and write a test class Cube Test in C++ or Java to
verify the functionalities of the class Cube **(9marks)**

SECTION B: DATABASE DEVELOPMENT AND ADMINISTRATION .(20MARKS)

A private university is interested in designing a database that will track its teachers, students and courses. Information of interest includes teacher's names, matricule, telephone, gender, grade, student names, student telephone, student matricule, student gender, student address, student age, course title, course code, course ID and coursecredit. Each student enrolls in one or many courses of his choice and a teacher is teaching one or many courses. When a student enrolls to a course at the end, he had a mark.

Problems to solve:

- | | |
|---|--------------------|
| 1- What is an Entity? | (1 mark) |
| 2- List all the possible entities. | (1.5 marks) |
| 3- What is an attribute? | (1 mark) |
| 4- On each entity listed in question 2, list its attributes. | (1.5 marks) |
| 5- What is an E-R Diagram? List all the components of an E-R diagram | (3 marks) |
| 6- Draw the equivalent E-R diagram of that private University using the crow's notation or Chen notation. | (3 marks) |
| 7- Convert the diagram to a relational model | (3 marks) |
| 8- Using SQL language answer the following questions: | |
| i. Create the tables of your database | (3 marks) |
| ii. Create the database of the university called "UNIV" | (1 mark) |
| iii. Insert a student your database | (1 mark) |
| iv. Retrieve the marks of all students in a particular subject | (1 mark) |

SECTION C: WEB DESIGN. (15MARKS)

1. Draw a picture of how the following HTML/CSS code will look when the browser renders it on-screen. Assume that the HTML is wrapped in a valid full page with a head and body. Indicate a non-white background by shading lightly. It is possible that some CSS rules shown will not apply to any elements. (7mks)

HTML:

```
<p> hello </p>
<div>
  <div> one </div>
  <div id="div"> two <br /> two two </div>
</div>
<div class="div"> three <br /> three three <br /> three three three </div>
<div class="div"> four <br /> four four <br /> four four four <br />
  <span class="div"> four four four four </span> </div>
<p> goodbye </p>
```

CSS:

```
div { background-color: white; border: 2px dashed black; padding: 1em; }
body > div { float: right; }
div div { background-color: cyan; margin: 1em; text-align: right; }
#div { text-decoration: underline; }
.div .div { border: 2px solid black; }
p { border: 2px solid black; clear: both; }
```

2. Give HTML5 code to create this form

HND Student Information

Name:

Surname:

Birth date *formatted as dd/mm/yyyy jj/mm/aaaa*

Place of birth :

E-mail:

Phone Number :

submit

(8marks)

SECTION D: NETWORKING. (15MARKS)

- 1- For the lower four layers of the OSI model ,give for each : (**8marks**)
 - i. Functions of the layer.
 - ii. An example of a protocol used in the layer
 - iii. An example of network or interconnection equipment and/or end Systems used.
- 2- What is a network topology? (**1mark**)
- 3- For each of the following network give a sketch, two advantages and two disadvantages
 - i. Star
 - ii. Ring (**6 marks**)

RÉPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR

COMMISSION NATIONALE D'ORGANISATION DE
L'EXAMEN HIGHER NATIONAL DIPLOMA EXAM (HND)

REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINISTRY OF HIGHER EDUCATION

NATIONAL COMMISSION FOR THE ORGANISATION OF
HIGHER NATIONAL DIPLOMA EXAM (HND) EXAM

National Exam of Higher National Diploma 2022 Session

Spécialty/option: SWE, NWS, EDM

Paper: Discrete Mathematics

Duration : 4 Hours

Credits : 4/4/10

GENERAL INSTRUCTIONS.

*You are reminded of the necessity of good English and orderly presentation of your material.
Where calculations are required, clearly show your working and be chronological in your answer.*

SECTION A :MCQS (20 MARKS)

INSTRUCTIONS:

Each question has four suggested answers: A, B, C, and D. Select the letter of the correct answer.

1) The range of the data 5, 15, 20, 3, 1, -5, and 17 is

- A) 25 B) 19 C) 15 D) 16

2) Given that the mean of 4 numbers is 12 and when the fifth number is added, the mean becomes 15, the fifth number is:

- A) 60 B) 30 C) 15 D) 27

3) The following information is known about a sample: $n = 100$, $\sum x = 200$, $\sum x^2 = 600$.

The

variance of the sample is :

- A) 2 B) 4 C) 5 D) 6

4) The lower class limit of the class 10 - 19 in the data 0 - 9, 10 - 19, 20 - 29 is:

- A) 10.5 B) 10 C) 9 D) 9.5

- 5) The stem and leaf plot of a data set is shown below.

Stem	leaves
5	5 4 1
6	6 4 3 5 4
7	8 4 1 4 5 8 9 1
8	2 8 0 2 4 3
9	4 1 6

This diagram reveals that the population from which the data is drawn is

- A) Normal B) Skewed to the right C) Skewed to the left D) None of the above

- 6) The probability density function, f , of a random variable X is defined by

$$f(x) = \begin{cases} 6x(1-x), & 0 < x < 1 \\ 0, & \text{otherwise.} \end{cases}$$

$$P(X < .05) =$$

- A) 0.25 B) 0.5 C) 0.75 D) 0.4

- 7) If $P(A) = 0.75$, $P(B) = 0.4$, and $P(A \text{ or } B) = 0.9$, $P(A \text{ and } B)$ is

- A) 0.75 B) 0.4 C) 0.65 D) 0.25

- 8) When a computer goes down there is a 75% chance that it is due to an overload and a 15% chance that it is due to a software problem. There is an 85% chance that it is due to an overload or a software problem. the probability that the breakdown is only due to a software problem is

- A) 0.15 B) 0.7 C) 0.1 D) 0.15

- 9) A batch of 25 injection-molded parts contains 5 that have suffered excessive shrinkage. Two parts are selected at random without replacement. The probability that the second part selected is one with excessive shrinkage is

- A) $\frac{1}{5}$ B) $\frac{1}{6}$ C) $\frac{1}{30}$ D) $\frac{4}{5}$

10) A computer center has three printers A, B and C, which print at different speeds.

Programs are routed to the first available printer. The probability that a program is routed to printers A, B and C are 0.6, 0.3 and 0.1, respectively. Occasionally, a printer will jam and destroy a printout. The probability that printers A, B and C will jam are 0.01, 0.05, and 0.04, respectively. Your program is destroyed when a printer jams. What is the probability that printer A is involved?

- A) 0.006 B) 0.24 C) 0.025 D) 0.01

11) Given that $(x+2)$ is a factor of the polynomial

$$f(x) = x^3 - 2x^2 + kx + 2. \text{ The value of } K \text{ is}$$

- A) 6 B) 1 C) 7 D) -7

12) The coefficient of the term in x^2 in the Maclaurin expansion of $\ln(1 - 2x)$ is

- A) 4 B) 1 C) 2 D) -2

13) $\lim_{x \rightarrow \infty} \frac{\sqrt{2x^2+1}}{3x-5} =$

- A) $\frac{2}{3}$ B) $\frac{\sqrt{2}}{3}$ C) ∞ D) 0

14) $\int_0^2 \frac{x}{\sqrt{4+x^2}} dx =$

- A) $2\sqrt{2}$ B) $2\sqrt{2} - 2$ C) $\sqrt{2} - 1$ D) $\frac{1}{2}(\sqrt{2} - 1)$

15) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be given by $f(x) = \sqrt{1 - 2x}$. The domain of f is

- A) $x \leq \frac{1}{2}$ B) $x \geq \frac{1}{2}$ C) $x \leq 2$ D) $x \geq 2$

16) The solution of the equation $|2x - 3| = 3$ is

- A) 0 B) 3 C) 0 and 3 D) -3

17) $\lim_{x \rightarrow 0} \frac{\sin px}{x} =$

- A) $\frac{1}{p}$ B) 1 C) $\frac{1}{2}$ D) P

18) Given that $y = \tanh 2x$, then $\frac{dy}{dx} =$

- A) $\operatorname{sech}^2 2x$ B) $2\operatorname{sech}^2 2x$ C) $\frac{1}{2}\operatorname{sech}^2 2x$ D) $-2\operatorname{sech}^2 2x$

19) The probability distribution of a discrete random variable X, the mean is

x	1	2	3
P(X=x)	1/2	1/3	1/6

- A) 1 B) 5/3 C) 1/3 D) 2/3

20) The probability density function of a continuous random variable X is

$$f(x) = \begin{cases} kx(2-x), & 0 \leq x \leq 2 \\ 0, & \text{elsewhere} \end{cases} \text{. The value of K is}$$

- A) $\frac{3}{4}$ B) $\frac{4}{3}$ C) 0 D) 1

21) Two independent random variables X and Y are such that $E(X)=3$ and $E(Y)=4$,
then $E(3X-2Y)=$

- A) 1 B) -1 C) 6 D) -8

22) Teams A has a probability $\frac{2}{3}$ of winning a game whenever it plays. If A plays 4
games, the probability that it wins exactly 2 games is :

- A) 1 B) $\frac{1}{3}$ C) $\frac{8}{27}$ D) $\frac{8}{9}$

23) Suppose 2% of the items made by a factory are defective. The probability P that
there are 3 defective items in a sample of 100 items is

- A) 0.18 B) 0.02 C) 0.03 D) 0.135

24) A continuous random variable X has probability density function $f(x)$, where

$$f(x) = \begin{cases} k, & \text{for } 0 \leq x \leq 2 \\ k(2x-3), & \text{for } 2 \leq x \leq 3 \\ 0, & \text{elsewhere} \end{cases}$$

The value of k is

- A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) $\frac{3}{4}$

25) Given that the function $f: \mathbb{R} \rightarrow \mathbb{R}$ monotone increasing and that $\int_2^{15} f(x)dx = 27$

and $\int_2^9 f(x)dx = 19$, then $\int_9^{15} f(x)dx =$

- A) 46 B) 8 C) 6 D) 13

- 26) Let f and g be the function from the set of integers to itself, defined by $f(x) = 2x + 1$ and $g(x) = 3x + 4$. Then the composition of $(f \circ g)(x)$ is
- A) $6x + 9$ B) $6x + 7$ C) $6x + 6$ D) $6x + 8$
- 27) Given that $\ln x - \frac{6}{\ln x} + 1 = 0$, then the value of x are
- A) 2 and -3 B) 3 and -2 C) e^{-3} and e^2 D) e^3 and e^{-2}
- 28) If $x = \sec t$ and $y = \tan t$, then $\frac{dy}{dx}$ is
- A) $\sec t \tan t$ B) cosec t C) $\sec^2 t$ D) cosec t cot t
- 29) $\int \frac{2x}{(x^2+7)^6} dx =$
- A) $\frac{1}{6} \ln(x^2 + 7)$ B) $-\frac{1}{5(x^2 + 7)^5}$ C) $-\frac{1}{7(x^2 + 7)^7}$ D) $\frac{1}{3} \ln(x^2 + 7)$
- 30) $f(x, y) = \frac{2x+y}{1-xy}$, then the value of $f(1, -3)$ is
- A) -1 B) 0 C) $\frac{1}{4}$ D) $-\frac{1}{4}$
- 31) Let $f(x, y, z) = x^2 \ln yz + 2 \cos xy$. Then $f_x(x, y, z) =$
- A) $2x \ln yz - 2y \sin xy$ B) $2x \ln yz + 2y \sin xy$
 C) $2 \ln yz - 2x \sin xy$ D) $2 \ln yz + 2y \sin xy$
- 32) Let $f: \mathbb{R}^3 \rightarrow \mathbb{R}$ be given by $f(x, y, z) = x^2 + 3xy + yz^3$. Then grad f is
- A) $(5x, 3y, z^3 + 3yz^2)$ B) $(2x + 3y, 3x + z^3, 3yz^2)$
 C) $(x^2 + 3y, 3x + z^3, 3yz^2)$ D) $2x + 3y, 3x, z^3 + yz^3$
- 33) Given that $x^2y + 5x^3y^4 = 7$, $\frac{dy}{dx} =$
- A) $\frac{2xy + 15x^2y^4}{x^2 + 20x^3y^3}$ B) $-\frac{2xy + 15x^2y^4}{x^2 + 20x^3y^3}$ C) $\frac{-2xy + 15x^2y^4}{x^2 + 20x^3y^3}$ D) $\frac{2xy + 15x^2y^4}{-x^2 + 20x^3y^3}$
- 34) The value of x for which $\left(\frac{1}{25}\right)^x = 5^{2(x+3)}$ is
- A) $\frac{2}{3}$ B) $-\frac{2}{3}$ C) $\frac{3}{2}$ D) $-\frac{3}{2}$
- 35) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function defined by $f(x) = x^3 + 5x$. Then the function f is
- A) periodic B) even C) odd D) parity

36) The value of k for which the function $f: \mathbb{R} \rightarrow \mathbb{R}$ given by $f(x) = \begin{cases} kx + 3, & \text{if } x < 2 \\ x^2 + 1, & \text{if } x \geq 2 \end{cases}$

is continuous at $x = 2$ is

- A) 5 B) 2 C) 1 D) -1

37) Let z be a complex number. The locus of points described by $|z + 2i| = 2$ is

- A) $x^2 + (y + 2)^2 = 2$ B) $x^2 + (y + 2)^2 = 4$
C) $y^2 + (x + 2)^2 = 2$ D) $y^2 + (x + 2)^2 = 4$

38) The principal argument of the complex number $z = \frac{-1+\sqrt{3}i}{1-i}$ is

- A) $\frac{11\pi}{12}$ B) $\frac{5\pi}{12}$ C) $\frac{7\pi}{12}$ D) $\frac{2\pi}{3}$

39) The value(s) of x for which $\log_3(x^2 - 10) - \log_3 x = 2$ is (are)

- A) 10 and -1 B) -10 and 1 C) -1 D) 10

40) If $y = \cosh 5x$ then $\frac{dy}{dx}$ is

- A) $-5 \sinh 5x$ B) $-\frac{1}{5} \sinh 5x$ C) $\frac{1}{5} \sinh 5x$ D) $5 \sinh 5x$

SECTION B: STRUCTURAL ANALYSIS : 30 MARKS

1) Let $f(x) = \frac{4\sqrt{x} - 4}{x^2 - 1}$.

a) What is the domain of $f(x)$?

b) Find the limit

$$\lim_{x \rightarrow 1} \frac{4\sqrt{x} - 4}{x^2 - 1} \quad (5 \text{ marks})$$

2) Evaluate $\int \frac{\sqrt{x^2 - 9}}{x} dx$ (3 marks)

3) Solve the differential equation

a) $(y^2 - xy)dx + x^2dy = 0.$

b) $\frac{d^2y}{dt^2} + 3\frac{dy}{dt} + 2y = e^{-2t}$ given that $y=0$ and $dy/dt=0$ when $t=0.$ (8 marks)

1) a) Find inverse Laplace transform , $L^{-1} \left\{ \frac{s+5}{(s^2 - 2s - 3)} \right\}$ (4 marks)

b) Solve, using Laplace transformation, the differential equation

$y'' + 4y = e^{-t}, \quad y(0) = 2, y'(0) = 1$ (5 marks)

2) Find the Fourier coefficients of the periodic function $f(x)$ given by $f(x) =$

$$\begin{cases} -k & \text{if } -\pi < x < 0 \\ k & \text{if } 0 < x < \pi \end{cases} \text{ and } f(x + 2\pi) = f(x) \quad (5 \text{ marks})$$

STATISTICS: 30 MARKS

1) The monthly earnings of computer engineers on part-time employment in a certain year in a firm are shown in the following table;

Earnings(millions)	1-3	4-6	7-9	10-12	13-15
Number of workers f	2	4	8	5	1

- a) Calculate the mean, variance and standard deviation given your answers correct to 2 decimal places. (15 marks)
- b) Calculate the median and mode of this data leaving your answers correct to 2 decimal places. (5 Marks)
- 2) In an experiment to determine the relationship between frequency and the inductive reactance of an electrical circuit, the following results were obtained:

Frequency(Hz)	Inductive reactance(ohm)
50	30
100	65
150	90
200	130
250	150
300	190
350	200

- 3) Determine the equation of the regression line of inductive reactance on frequency, assuming a linear relationship. **(5 marks)**
- 4) In an experiment to determine the relationship between frequency and the inductive reactance of an electrical circuit, the following results were obtained:

Frequency(Hz)	Inductive reactance(ohm)
50	30
100	65
150	90
200	130
250	150
300	190
350	200

Determine the equation of the regression line of inductive reactance on frequency, assuming a linear relationship. **(5 marks)**

PROBABILITY: 20 MARKS

1) Roll a single fair die and let X be the outcome. Suppose we want to compute the probability

$p(x \geq 6)$ Calculate:

- a) The expected value $E(X)$
- b) The variance σ^2
- c) $p(x \geq 6)$ by exact probability
- d) $p(x \geq 6)$ by Markov inequality
- e) $p(x \geq 6)$ by the two-sided (usual) chebychev's inequality
- f) $p(x \geq 6)$ by the one-sided chebychev's inequality

(15 marks)

2) A shop stocks only two brands A and B of desktops. These desktops are of two sizes large (L) and small (S). 70% are of brand A and 30% of desktops are of brand B. 40% of those of brand B are of small size and 70% of brand A are of large size.

- a) Draw a tree diagram to represent the above information. Find the probability that
- b) A desktop chosen at random from the stock will be small size. **(2 marks)**

3) c) A small desktop chosen random from the stock will be of brand A. **(3 marks)**

National Exam of Higher National Diploma 2022 Session

Spécialty/option : All Specialties

Paper: French Language

Duration : 2 hours

Credit : 1/2

Instruction to candidates: Answer all questions

PREMIERE PARTIE: QUESTIONS A CHOIX MULTIPLES

- 1) Moi je préfère prendre _____ café au lait.
a) de la b) du c) de l' d) des
- 2) _____ routes sont mauvaises ces derniers temps.
a) la b) le c) aux d) les
- 3) Elles ont acheté beaucoup _____ chaussures.
a) des b) de la c) les d) de
- 4) Quand on est malade, on va _____ hôpital.
a) au b) la c) à l' d) l'
- 5) Le professeur parle _____ élèves.
a) les b) aux c) au d) l'
- 6) On l'avait emmené à l'hôpital _____ la maladie était grave.
a) car b) or c) puis d) et
- 7) Je ne vais plus parler _____ vous puissiez écouter la radio.
a) alors que b) avant que c) afin que d) pendant que
- 8) Il vous a cherché _____ plus de deux heures.
a) pendant b) dans c) en d) pour
- 9) Nous _____ au football tous les samedis.
a) jouez b) jouons c) jouent d) joues
- 10) Paul et toi _____ la radio tous les matins.
a) écouter b) écoutons c) écoutez d) écoutent

- 11) Cette dame voulait m'aider, _____ j'ai refusé.
a) mais b) ou c) donc d) car
- 12) Vous _____ du remords d'avoir menti.
a) eûtes b) eurent c) eus d) eûmes
- 13) Ce _____ un voyage très pénible.
a) fus b) fut c) fûmes d) fûtes
- 14) Ma sœur et son amie _____ en retard ce matin.
a) sont arrivé b) sont arrivée c) sont arrivés d) sont arrivées
- 15) Il _____ en titubant parce qu'il était soûl.
a) marchions b) marchais c) marchait d) marchaient
- 16) La mère de mon épouse est ma _____.
a) tante b) mère c) belle-mère d) belle-fille
- 17) Il y a quelques années, le Cameroun _____ en guerre contre le Nigéria.
a) allais b) irait c) ira d) allait
- 18) C'est moi qui _____ pris ton livre.
a) avait b) est c) a d) ai
- 19) « He was going to the farm last Friday » can be translated into French as :
a) il allait au champ vendredi dernier b) il était allé au champ vendredi dernier c) il était allée au champ vendredi dernier d) il allais au champ vendredi dernier
- 20) Les chambres de _____ hôtel sont climatisées.
a) cet b) ce c) ces d) cette
- 21) « Practice makes perfect » means :
a) pratiquer c'est perfectionner b) la pratique fait la perfection
c) en pratiquant on perfectionne d) en forgeant on devient forgeron
- 22) Ma femme aime beaucoup les _____.
a) bijou b) bijous c) bijoux d) bijouses
- 23) Cette forêt est pleine d' _____ sauvages.
a) animal b) animals c) animales d) animaux
- 24) Je suis ici _____ lieu et place de mon feu père.
a) en b) ou c) dans d) sur
- 25) Toute explication est donnée _____ bas de page.

- a) en b) ou c) dans d) sous

26) Le mot « mari » a pour synonyme :

- a) père b) époux c) homme d) beau-fils

27) Bill et son frère _____ les mathématiques l'année passée.

- a) étudiais b) étudiait c) étudiiez d) étudiaient

28) Dans cette école, plusieurs élèves _____ déjà très bien français.

- a) savent b) parle c) parlent d) sait

29) Nous _____ à la maison très tard ce soir-là.

- a) arrivâtes b) arrivâmes c) arrivas d) arriva

30) Je tiens à lui parler _____ il ne veut pas m'écouter.

- a) et b) ou c) car d) or

31) Les chasseurs ont fui quand ils ont entendu le _____ du lion.

- a) abolement b) beuglement c) miaulement d) rugissement

32) Le chien _____ la caravane passe.

- a) grogne b) aboie c) rugit d) braie

33) _____ orange est très sucrée.

- a) cette b) cet c) ces d) ce

34) _____ enfant me semble être très indiscipliné.

- a) cette b) cet c) ce d) ces

35) Il a déjà visité tous _____ pays.

- a) cette b) cet c) ces d) ce

36) Les bergers du village ont fait vacciner _____ bœufs.

- a) ses b) son c) votre d) leurs

37) Chez mon oncle, _____ enfants l'appellent toujours Tonton.

- a) tes b) nos c) vos d) ses

38) Tous les lauréats ont porté des cravates _____

- A) vertes citron b) vert citron c) verts citron d) vertes citrons

39) Plusieurs _____ ont été organisés cette année.

- a) festivals b) festivaux c) festivales d) festivax

40) Hier, je lui ai donné une montre mais il _____ cassée. a) la b) là c) l'a d) l'as

DEUXIEME PARTIE : COMPREHENSION ECRITE

Lisez le texte et répondez aux questions ci-dessous

LES TRANSFORMATEURS ET VENDEURS DES PRODUITS FUMÉS

Dans le groupe des transformateurs, on distingue les fumeurs et les sécheurs de poisson. Entièrement contrôlée par les femmes (92%), la transformation artisanale du poisson constitue une importante activité dans le secteur de la pêche artisanale, avec plus de 80% de poisson vendu dans le pays. La moyenne d'âge dans l'activité est de 39 ans, avec une expérience professionnelle de 10 ans. La taille moyenne de ménage est de 9 personnes. Seulement 1/3 de cette population peut lire et écrire. Les camerounais dominent cette activité avec 45% d'effectifs, suivis de nigérians (40%) et de béninois (15%). La profession se transmet de mère en fille ou à travers le mariage à un pêcheur. La plupart des transformateurs sont membres ou appartiennent aux associations des commerçants de poisson frais ou fumés.

La quasi-majorité des femmes transformatrices s'approvisionnent auprès de leur époux pêcheurs. Les espèces les plus transformées sont les petits pélagiques tels que l'Ethmalose et la sardinelle. Ces femmes transforment le poisson dans les cases fumoirs et vendent elles-mêmes leurs produits. Le principal matériel utilisé dans le fumage reste le bois, ce qui pose un problème environnemental assez sérieux (conservation de la forêt). Environ 62% des femmes transformatrices sont nanties (revenus annuels moyens de près de 900 000 FCFA à Limbe) et assistent ainsi leurs maris dans leurs tâches traditionnelles telles l'envoie des enfants à l'école, l'achat du poste de télévision à la maison ou la ration alimentaire familiale. On en rencontre qui sont patron de pêche, employant des équipages de pêcheurs sous-contrat. Les fonds investis proviennent à 87% des ressources propres provenant des tontines et épargnes personnelles.

Questions :

1. Quelles sont les 02 catégories de personnes qui constituent les transformateurs ?
2. Citer 02 autres pays qui transforment le poisson.
3. Quelles sont les espèces les plus transformées ?
4. Auprès de qui s'approvisionnent la quasi-totalité des femmes ?
5. A quelle fin les femmes transformatrices utilisent leurs revenus ?
6. D'où proviennent les fonds investis dans l'activité de transformations ?

TROISIEME PARTIE: EXPRESSION LIBRE

Rédiger une lettre de motivation à l'appel d'offre de recrutement d'un directeur au sein de la Coopérative SOCOPPROMACAM (Société Coopérative de Production de Manioc du Cameroun).

National Exam of Higher National Diploma 2022 Session

Spécialty/option : All Specialties

Paper: English Language

Duration : 2 hours

Credit : 1/2

SECTION A: READING COMPREHENSION (20 Marks)

PASSAGE. PEACE: A GOLDMINE

The undeniable benefits of peace can't be overemphasized.

Peace building, conflict resolution, conflict prevention, whichever term you use, sits uneasily within one particular field, discipline, or government department, diplomacy, defense and security, justice and human rights, any or all of the above.

Perhaps it is unsurprising that there is no neat fit. Addressing the root causes and drives of conflict is a long-term and complex task. Conflicts have multiple drivers and, operate as systems. Responses require the influence, resources and commitment of different people and institutions at different times.

Yet, the fact that peace building does not have a natural home, does not mean it should not have a central place in our responses to some of today's global challenges. And there are three increasingly urgent reasons why investing in peace building and conflict prevention should be a high and central priority.

The effects of conflict are far-reaching. The majority of those risking their lives trying to reach Europe are from Syria, Afghanistan, Somalia, and other areas beset by violent conflict, insecurity, or political repression.

Globally, the number of those forced to leave their homes due to war, persecution or natural disaster reached staggering heights at the end of 2014 and beyond. Some 19.5 million of these are people who have fled their country as refugees and half of them are children.

Seen in economic terms, the impact is also huge. The Global Peace Index calculated the cost of conflict to the global economy in the year 2013 to be 9.21 trillion pounds as a result of increased military spending by states and more people driven from their jobs.

Guns and violence to political problems alone don't work. In fact, it can sometimes complicate the issues at hand.

One of the four major shifts recommended by the eminent High-Level Independent Panel which reviewed the U.N.'s Peace Operation in 2013, was for the "Primacy of Politics" "Lasting peace is not achieved nor sustained by guns and violence, but through political solutions."

Conflict shatters lives and stunts development. More than 1.5 billion people live in countries affected by violent conflict, and the gap between those countries enjoying relative peace and those afflicted by conflict is growing. The newly adopted Sustainable Development Goals respond to the fact that no low-income conflict-affected country achieved a single one of the Millennium Development Goals.

Peace building approaches are an essential part of the toolkit we need to meet Goal 16: to "promote peaceful and inclusive societies for sustainable development."

In order for a sustainable peace to stand any chance, those affected by (and are involved in) conflict must own and identify with the responses and solutions to it. Fellow citizens, let's say "NO" to violence and embrace peace in order to build a better and conducive environment. For it's the engine that fuels sustainable development and prosperity for all.

Source: Teresa Dumasy's 3 Reasons why supporting peace is more important than ever
Using only the material from the reading comprehension passage, answer the following questions:

QUESTIONS: (2Marks each)

1. The speaker gives ____ reasons for a majority of people risking their lives trying to reach Europe.
 - A) four
 - B) three
 - C) five
 - D) six

2. When the speaker says “Peace-building, conflict resolution, conflict prevention, whichever term you use”, it means that these terms are _____
- A) antonyms
 - B) homonyms
 - C) synonyms
 - D) homophones
3. Which word from the list below has the same number of syllables as in “overemphasized”
_____?
- A) Nationality
 - B) Politician
 - C) Intentional
 - D) Internationally
4. Trying to address the root cause of a conflict is very tedious because conflicts _____
- A) have multiple causes.
 - B) operate at different levels.
 - C) require the commitment of many people to solve.
 - D) don't have natural causes.
5. The cost of conflict to the global economy was calculated in 2013 to be _____
- A) 19.21 trillion pounds
 - B) 9.21 trillion dollars
 - C) 9.2 trillion pounds
 - D) 9.21 trillion pounds
6. Lasting peace can't be sustained by guns and violence. This means that _____
- A) guns and violence do not achieve any peace.
 - B) peace obtained by the barrel of guns and violence is short lived.
 - C) peace can easily be lost by guns and violence.
 - D) it is useless to think that guns and violence can solve a conflict.

7. Which word from the list below has the same consonant sound as the underlined letter in “operation”?
- A) Picture
 - B) Measure
 - C) Shoe
 - D) Pitch
8. Part of Goal 16 is to promote inclusive societies. This refers to societies where _____
- A) everybody is treated according to their tribe/culture.
 - B) people are included in decision making.
 - C) there is neither discrimination nor favouritism.
 - D) sustainable development is a priority
9. The passage is titled “Peace: A Goldmine” This title is a good example of _____
- A) simile
 - B) irony
 - C) personification
 - D) metaphor
10. The passage is likely to be _____
- A) a talk
 - B) a speech
 - C) a report
 - D) an article

SECTION B : GRAMMAR AND VOCABULARY (20 marks)

GRAMMAR (20 mks)

Choose the appropriate letter that corresponds to the right answer (1 mark each)

1. He bought a ----- car for his wife as a birthday gift
- A) New brand red
 - B) brand new red
 - C) red new brand
 - D) red brand new

2. The dog wagged ----- tail
A) It's B) its C) it is D) its'
3. An MC is someone who----- other people at the occasion.
A) Introduce B) introduces C) introduce D) introducing
4. Cameroon is a bilingual country-----
A) Didn't it B) it is C) it is D) isn't it
5. I went to Germany -----my aunt was there
A) Before B) after C) because D) until
6. My people ----- to take good health for granted
A) Turn B) torn C) tend D) tent
7. Most of the -----in my house -----made of wood.
A) Furnitures, are B) furniture, is C) furniture, are D) furniture, were
8. Awa received a prize ----- her exams
A) For pass B) for haven passed C) for having pass D) for have passed
9. Most often, my father ends his letter with -----affectionately
A) You'sB) yours C) yours' D) your
10. Who played -----among the eleven players
A) well B) better C) best D) worse
11. The couple wanted to bless their marriage -----they went to see a church minister.
A) then B) so C) after D) and
12. The novel contains----- about life
A) Much information B) a lot of informationsC) a good number of informations D) too many informations
13. They both ran fast, but I think Eposi is
A) More faster B) much more faster C) faster D)the more faster
14. She has a very good job. I am sure she -----over two hundred thousand francs
A) Wins B) gains C) earns D) receives
15. Pen is to cow as -----is to dog
A) Stable B) den C) sty D) kennel
16. A -----Of locust invaded the vegetable farm.

- A) Group B) swarm C) troop D) flock
17. When I looked ----my childhood, I realize what a happy time it was.
A) Down on B) out of C) down at D) back on
18. Has -----postman been here? I am expecting -----parcel.
A) The/the B) a/a C) the/a D) a/the
19. I looked everywhere for some cooking oil, I could only find-----
A) A few B) a little C) few D) little
20. Which of the following sentences is correctly punctuated?
A) My favourite sports are; fishing, golf, and swimming
B) my favourit sports are: fishing, golf and swimming
C) my favourite sports are. fishing, golf and swimming
D) my favourite sports are, fishing, golf and swimming

VOCABULARY (10 marks)

Choose the answer from the alternative (A B C D) that best explains the underlined phrase(s) or word (1 mark each)

1. The members of the church were discussing _____
 - A. With each other
 - B. Between each other
 - C. With one another
 - D. Among themselves
2. A loaf of bread was shared _____ he four students
 - A. Between
 - B. Themselves
 - C. Within them
 - D. Among
3. The punctuation mark used for enclosing the title of a poem is
 - A. Question mark
 - B. Exclamation mark
 - C. Bracket
 - D. Quotation mark or inverted comma open and close

4. Use to indicate a abrupt break or change in thought within a sentence
- Quotation mark
 - A comma
 - Bracket
 - A dash
5. _____ is used to show the separation of ideas or element within the structure of a sentence
- A colon
 - Semi colon
 - Full stop
 - A comma
6. The policeman stood ----- the man at the corner
- Looking on
 - B) seeing
 - C) glaring at
 - D) watching
7. It was ----- big, they couldn't plant it.
- Believe
 - B) belief
 - C) believes
 - D) belief
8. I have always wanted to drive big, ----- cars
- Luxurious
 - B) Luxuriantly
 - C) luxuriate
 - D) lux
9. Tom was ----- a special prize for good conduct
- Denoted
 - B) awarded
 - C) rewarded
 - D) allocated

10. A little learning is a ----- thing

- A) Dangerous
- B) B) wonderful
- C) C) great
- D) D) useful

SECTION C: SPOKEN ENGLISH (20 MARKS)

1. Subject-verb Agreement : Choose the appropriate verb to complete from the brackets to fill out the blanks. (5 Marks)

- a) Neither the students nor their teacher..... (go/goes) to school everyday.
- b) Paul like his brother..... (drink/drinks) alcohol heavily every time.
- c) Anita or Laura..... (eats / eat) snails every day.
- d) None of the boys..... (was/were) late.
- e) This pair of shoes no longer..... (fits/fit).

2. Verb Tenses: Rewrite and complete each sentence with the appropriate form of the verb in brackets. (10 Marks)

- a) Last evening they..... (seek) help from a nearby garage when their car broke down.
- b) By the time the Minister arrived they..... (ring) the college bell thrice.
- c) By 2022, most of the students writing this test..... (graduate) from the university.
- d) If I lost my job..... (go) to Britain.
- e) We were surprised many students..... (choose) to go home though we had not sent them away.
- f) The patient..... (bleed) to death due to her carelessness.

- g) The car..... (slide) and fell in a ditch.
- h) He..... (wind) up the windows when the thief was about to rob the car.
- i) We sell.....(grind) spices here.
- j)(to have) it rained yesterday, we would have planted the seeds.

3. Question tags : Add tags to the following statements. (5 Marks)

- a) I am responsible for the provision of drinks,.....?
- b) Hellen wasn't sick on the day of the test,.....?
- c) There aren't students in the garden,.....?
- d) You won't do that to me,.....?
- e) Let's go for a walk,.....?

SECTION D: WRITING (30 MARKS)

Write an essay of about 350 words on any one of the following topics

1. Describe the process of producing any cash crop in your area.
2. Write a summary of not more than 90 words on the reasons why supporting Peace is very important, than ever and how to go about it, selecting valuable information from the reading comprehension passage. Take care to give a continuous connection of ideas, and use your own words as far as possible. Failure to keep within the limit will be penalized.
3. With the sudden appearance of the Covid-19 pandemic, working at home has become the better option than working in an office. To what extent do you agree?

RÉPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
.....
MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR
.....
COMMISSION NATIONALE D'ORGANISATION DE
L'EXAMEN HIGHER NATIONAL DIPLOMA EXAM (HND)
.....

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
.....
MINISTRY OF HIGHER EDUCATION
.....
NATIONAL COMMISSION FOR THE ORGANISATION OF
HIGHER NATIONAL DIPLOMA EXAM (HND) EXAM
.....

National Exam of Higher National Diploma 2022 Session

Spécialty/option: Software Engineering (SWE)

Paper: Information System

Duration : 3 Hours

Credits : 6

SECTION A: SYSTEM ARCHITECTURE 40 MARKS

1. What are the essential characteristics of cloud computing? (4mks)
2. How many types of deployment models cloud? (4mks)
3. Describe about the different Guided Medias. (4mks)
4. What do you mean by wireless communication? (4mks)
5. List two (02) advantages and two (02) disadvantages of fiber optics cable.(4mks)
6. List three (03) factors on which data rate depends. (4mks)
7. What is an Object server in client server environment? (4mks)
8. What are the two broad classes of middleware in client server environment?(4mks)
9. What are the five major technologies that can be used to create Client/Server applications in client server environment? (4mks)
10. What is *public cloud* and *private cloud*? (4mks)

SECTION B: OPERATING SYSTEMS (40 MARKS)

1. Why are user-level threads packages generally cooperatively scheduled? (3mks)
2. Describe a sequence the sequence of step that occur when a timer interrupt occurs that eventually results in a context switch to another application. (6mks)
3. Context switching between two threads of execution within the operating system is usually performed by a small assembly language function. In general terms, what does this small function do internally? (6mks)

4. What is a *race condition*? Give an example. (4mks)
5. What is a critical region? How do they relate to controlling access to shared resources? (5mks)
6. What are three requirements of any solution to the critical sections problem? Why are the requirements needed? (5mks)
7. Why is *turn passing* a poor solution to the critical sections problem? (4mks)
8. Interrupt disabling and enabling is a common approach to implementing mutual exclusion, what are its advantages and disadvantages? (4mks)

SECTION C: PROJECT MANAGEMENT AND LEGAL REGULATIONS (20 MARKS)

1. Define the following terms
 - a. Project (1 mark)
 - b. Software project manager (1mark)
2. Software project management comprises of a number of activities, which contains planning of project, deciding scope of software product, estimation of cost in various terms, scheduling of tasks and events, and resource management.
 - a. What are the activities that are carried out during project scope management activities (4marks)
 - b. Explain what is usually estimated during project estimation phase (8 marks)
 - c. Discuss two types of Project Estimation Techniques(2marks)
3. A. what is Project Scheduling (2marks)
B. wat are the activities that are carried out during Project Scheduling (4marks)

RÉPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
.....
MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR
.....
COMMISSION NATIONALE D'ORGANISATION DE L'EXAMEN
HIGHER NATIONAL DIPLOMA EXAM (HND)
.....

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
.....
MINISTRY OF HIGHER EDUCATION
.....
NATIONAL COMMISSION FOR THE ORGANISATION OF
HIGHER NATIONAL DIPLOMA (HND) EXAM
.....

National Exam of Higher National Diploma 2022 Session

Spécialty/option : FOT, APT, CPT, APA, AGE, AGP, CET, UPL, BST, CAR, JOC, RCE, MEM, CHM, CHP, ELT, EPS, ACR, QOP, PSE, PLO, ASM, PMA, HUR, ACC, MTS, BFI, INT, BFP, FCT, TAT, HMC, DCT, EMA, SPE, NWS, SWE, CSN, HWM, ICA, CWD, EDM, NGO, AND, BCR, SPW, BMW, CUT, ISM, LGA, PCH, TOP, AMS, APG, SOW, FSD, AFI, BDM

Paper: Law and Citizenship Education

Credit : 2

Duration : 2 hours

Instructions: Answer all questions.

Logical presentation, grammar, neat work and good handwriting counts.

SECTION A: Introduction to Law and Fundamental Rights. (20 marks)

1. Examine five fundamental principles guiding the administration of justice in Cameroon.

SECTION B. Civics, Ethics, Moral and Citizenship Education. (20marks)

2. Critically examine five different methods for the acquisition of Cameroonian nationality.

SECTION C. Labour Law. (20marks)

3. Briefly examine the reciprocal duties of parties engaged in a labour contract

SECTION D. Business law: (20marks)

4. "Certain characteristics are peculiar to insurance contracts which are not found in ordinary contract law" Asses the veracity of this statement.

SECTION E. Company law: (20marks)

5. Examine the discrepancies that exist between public Limited Companies and private limited companies as provided for by the OHADA Law.

National Exam of Higher National Diploma 2022 Session

Spécialty/option : All Specialties

Paper: Enterprise Creation And Entrepreneurship

Duration : 2 hours

Credit : 1

Instructions: Answer all questions.

SECTION 1: ENTREPRENEURSHIP (34 Marks)

1. Differentiate between the following
 - a) Entrepreneurship and Intrapreneurship
 - b) Innovators and imitators **(4 marks)**
2. What is an "executive summary?" Why is the executive summary often called the most important part of a business plan? **(15 marks)**
3. Identify any four (5) roles of entrepreneurship in the economic development of a country.
(15 marks)

SECTION 2: GENERAL ECONOMICS (33 Marks)

1. a) Identify and explain briefly the four fundamental economic questions that every society must resolve, and why. **(10 marks)**
 - b) Distinguish between microeconomics and macroeconomics. **(5marks)**
2. a) Distinguish with the aid of diagrams between a change in quantity demanded and a change in demand. **(8 marks)**
 - b) Identify and explain five factors that may cause a change in demand? **(10marks)**

SECTION 3: COMPANY LAW (33 Marks)

- 1) Critically examine the principle of corporate personality. **(20 marks)**
- 2) Explain the types of contributions made by shareholder of a company. **(13 marks)**

RÉPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
.....
MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR
.....
COMMISSION NATIONALE D'ORGANISATION DE
L'EXAMEN HIGHER NATIONAL DIPLOMA EXAM (HND)
.....

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
.....
MINISTRY OF HIGHER EDUCATION
.....
NATIONAL COMMISSION FOR THE ORGANISATION OF
HIGHER NATIONAL DIPLOMA EXAM (HND) EXAM
.....

National Exam of Higher National Diploma 2022 Session

Spécialty/option: SWE, CSN, DBM

Paper : Digital Electronics

Duration : 4 hours

Credits : 7/7/4

Instructions: Answer all questions. Calculators of any type are not authorized!

SECTION A: NUMBER SYSTEM AND CODES (20marks).

MCQs, for each question, four answers are proposed. Write the letter for the correct answer against the question number. Each question carries 1mark.

- 1) The value of radix in binary number system is _____
a) 2 b) 8 c) 10 d) 1
- 2) If the decimal number is made of an integer part and fractional part. Then its binary equivalent is obtained by _____ the fractional part of number continuously by 2.
a) Dividing
b) Multiplying
c) Adding
d) Subtracting
- 3) An unweight code in which only one bit changes from one code number to the next is _____.
a) BCD b) Excess-3 c) Gray d) ASCII
- 4) The largest BCD number that can be represented with four binary bits is _____.
a) 9 b) 10 c) 15 d) 16
- 5) Considering x is a Boolean variable, which of the followings is NOT ALWAYS TRUE?
a) $x + x = x$ b) $x \cdot x = x$ c) $x \cdot 1 = x$ d) $x + 1 = x$
- 6) The universal gate is
a) NAND gate b) OR gate c) AND gate d) None of the above

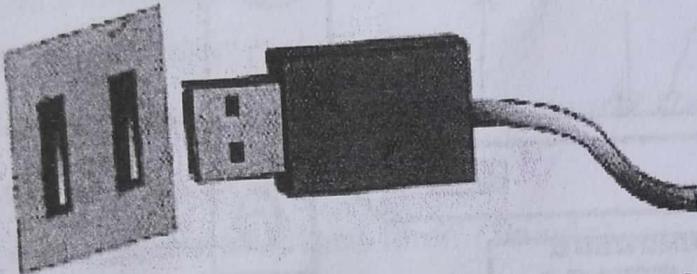
- 7) The inverter is
a) OR gate b) NOT gate c) AND gate d) None of the above
- 8) Which of the following logical operations is represented by the + sign in Boolean algebra?
a) Inversion b) AND c) OR d) complementation
- 9) The binary equivalent of gray code 1111 is :
a) $(1101)_2$ b) $(1011)_2$ c) $(1110)_2$ d) $(1010)_2$
- 10) The BCD number for decimal 347 is _____.
a) 1100 1011 1000 b) 0011 0100 0111 c) 0011 0100 0001 d) 1100 1011 0110
- 11) Convert binary to octal: $(110110001010)_2 = ?$
a) $(5512)_8$ b) $(6612)_8$ c) $(4532)_8$ d) $(6745)_8$
- 12) What is the addition of the binary numbers 11011011010 and 010100101?
a) 0111001000 b) 1100110110 c) 11101111111 d) 10011010011
- 13) Binary subtraction of $100101 - 011110$ is
a) 000111 b) 111000 c) 010101 d) 101010
- 14) Perform multiplication of the binary numbers: 01001×01011
a) 001100011 b) 110011100 c) 010100110 d) 101010111
- 15) Divide the binary numbers: $1010001 \div 1000$
a) 1010.001 b) 1000.001 c) 1100.001 d) 0011.001
- 16) Which numbering system uses numbers and letters as symbol?
a) Decimal b) binary c) Octal d) hexadecimal
- 17) The octal number $(651.124)_8$ is equivalent to _____.
a) $(1A9.2A)_{16}$ b) $(1B0.10)_{16}$ c) $(1A8.A3)_{16}$ d) $(1B0.B0)_{16}$
- 18) The sign of a negative binary number is given by its _____.
a) MSB b) LSB c) Byte d) Nibble
- 19) The largest two digit hexadecimal number is _____.
a) $(FE)_{16}$ b) $(FD)_{16}$ c) $(FF)_{16}$ d) $(EF)_{16}$

- 20) The 1 in the binary number 1000 has a place value of ----- in decimal
a) 1000 b) 16 c) -1 d) 8

SECTION B: COMPUTER FUNDAMENTAL (80MKS)

I) HARDWARE (20marks)

1) Study the diagram below and answer questions that follow:



1. a) Identify the port shown in the diagram. (1mark)

1. b) Give TWO reasons why the identified port in the figure above finds widespread use in computer systems. (2marks)

2) Name the following hardware components and give their role in a computer. (7.5marks)

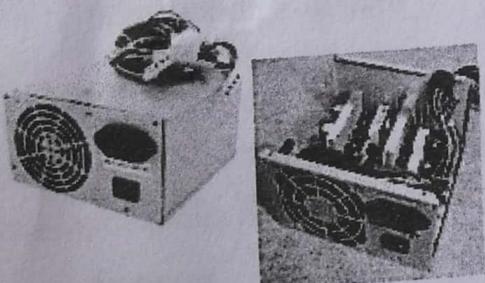


Figure 1

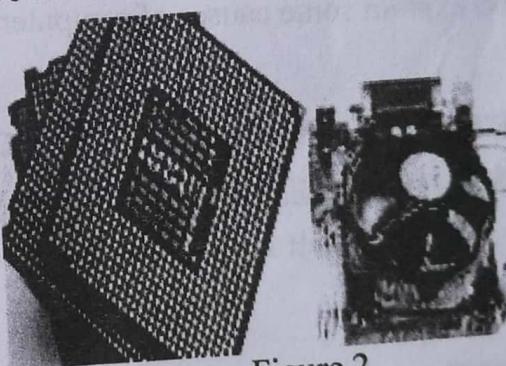


Figure 2

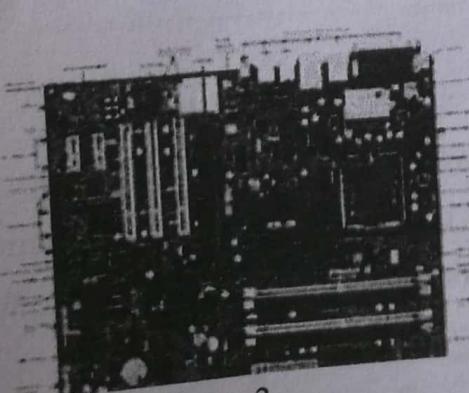


Figure 3

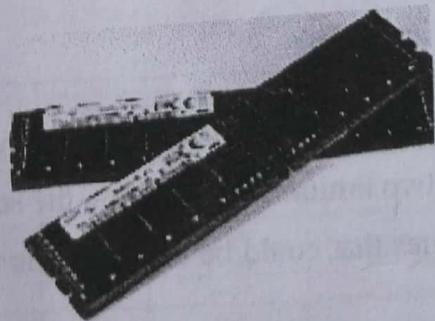


Figure 4

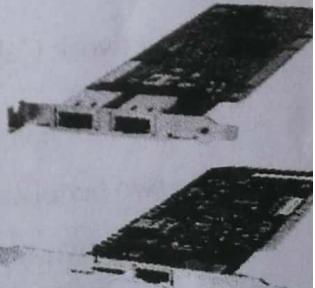
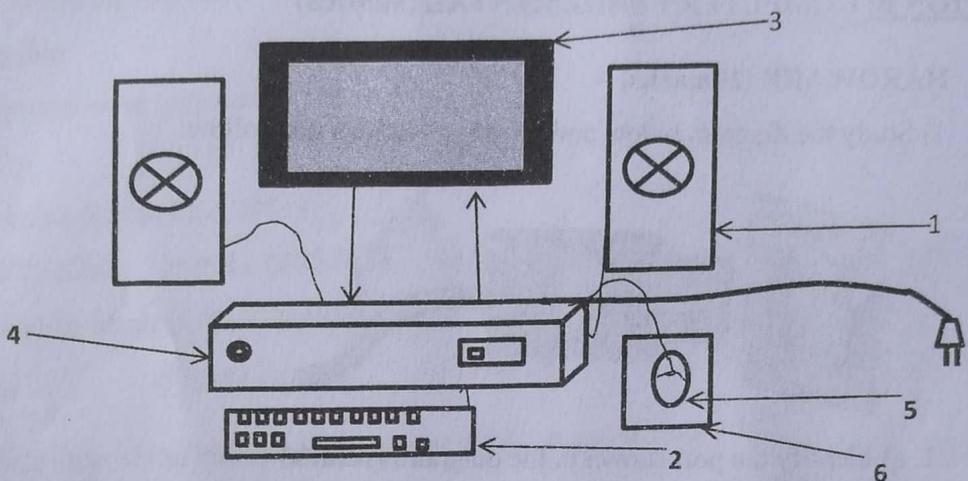


Figure 5

3) What is the main difference between a mainframe computer and a supercomputer?
(2.5marks)

4) Given the following diagram below



4. a) Identify the various components from 1 to 6. **(3marks)**
4. b) Identify two input devices and two output devices. **(2marks)**
5) State and explain some causes of computer poor performance. **(2marks)**

II) NETWORK AND MOBILE DEVICES (40MRKS)

1. What are the functions of the following network devices **(5marks)**
 - a. Distributor
 - b. Modem
 - c. Router
 - d. NIC
 - e. Network Cable
2. A school has just decided to link its computers on a network.
 - a) Give two benefits and two limitations of linking the school's computers on a network. **(4marks)**
 - b) State any two topologies that could be used for this networking, illustrating your answer with diagrams. **(6marks)**
3. a) What is a mobile device? **(2marks)**
 - b) List two types of mobile devices you know **(3marks)**

- c) What are the common types of operating systems used in mobile devices you know **(2marks)**
- d) Give three examples of common applications used in mobile devices **(3marks)**
- e) Briefly describe in point form one method you will use to connect your mobile phone to a computer for file sharing. **(5marks)**
4. Considering that a company needs 60 usable host ip addresses for its connectivity to the internet. Having a network address of 198.100.10.0. Answer the following questions.
- What is the address class? **(2marks)**
 - What is the default subnet mask of the above network? **(2marks)**
 - What is the custom subnet mask? **(2marks)**
 - What is the total number of subnets form? **(2marks)**
 - What is the total number host per subnet? **(2marks)**

III) MICROSOFT WORD, EXCEL AND POWERPOINT (20MARKS)

- Define and give an example of the following. **(4marks)**
 - Spreadsheet software
 - Presentation Software
 - Microsoft Access
 - Microsoft word
- A shopkeeper recently transferred his daily records from a ledger to a spreadsheet program.
- a) State and explain four advantages that a spreadsheet program has over the recording in a ledger. **(4marks)**

Below is a sample spreadsheet used by the shopkeeper above.

A	B	C	D	E	F	G	H
1	2	3	4	5	6	7	8
S/N	Item	Quantity	Unit Price	Unit Sell Price	Total Profit	Remark	
1	Mambo	25	500	600	100	Good Business	
2	Bread	23	800	1000	200	Good Business	
3	Savon	14	550	700		Good Business	
4	Sugar	7	900	1500		Good Business	
5	Ground nut Oil	10	1200	1300		Good Business	
6	Milk	5	1500	1400		Bad Business	
7	Biscuit	9	2500	2600		Good Business	
8	Sweet	11	350	300		Bad Business	
9	Butter	25	480	500		Good Business	
10	Rubbing Oil	85	950	1000		Good Business	
Grand Profit							
11							
12							
13							
14							
15							
16							
17							

(F1 - E1)
Profit (F1)

- b) State the formula that can be used to calculate the total profit for the item mambo in cell G4. **(3marks)**
- c) Describe how the formula in G4 can be copied in cells G5 to G13. **(3marks)**
- d) Give the formula in G15 that can be used to generate the grand profit. **(3marks)**
- e) Given that the quantity of milk and its unit price are changed to 10 and 1000 respectively, state the changes that will be observed on the spreadsheet. **(3marks)**

RÉPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR

COMMISSION NATIONALE D'ORGANISATION DE
L'EXAMEN HIGHER NATIONAL DIPLOMA EXAM (HND)

REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINISTRY OF HIGHER EDUCATION

NATIONAL COMMISSION FOR THE ORGANISATION OF
HIGHER NATIONAL DIPLOMA EXAM (HND) EXAM

National Exam Of Higher National Diploma 2022 Session

Spécialty/Option: Software Engineering (SWE)

Paper : System Analysis And Design

Duration : 4 hours

Credits : 7

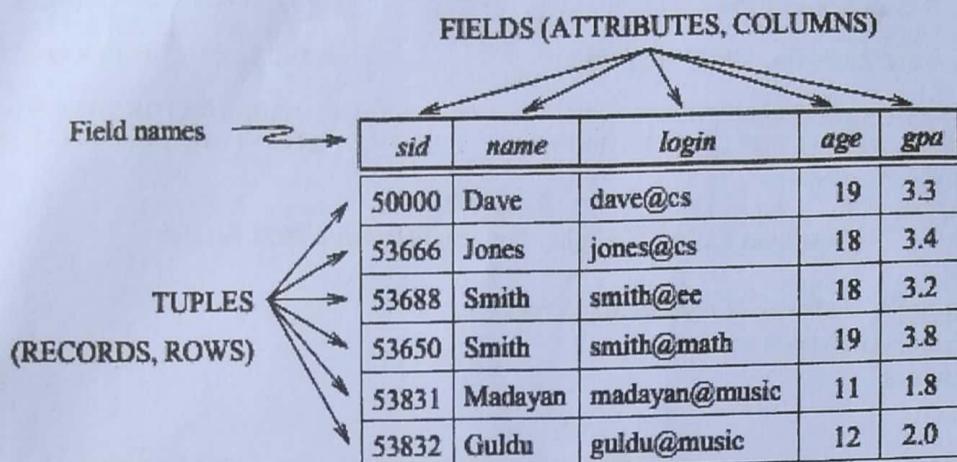
SECTION A: INFORMATION SYSTEM AND DATA BASE (50MARKS)

I. Object Modeling 25 Marks)

- 1- Differentiate between a class and a method. (5marks)
- 2- What is the difference between public, private and protected access modifiers? (5marks)
- 3- List some characteristics of UML? (5marks)
- 4- Class diagrams are the most common diagrams used in UML. Explain four purpose of the class diagram. (5marks)
- 5- Give an example of a class, composed of a name, attributes and methods. (5marks)

II. Database Administration with MySQL (25 Marks)

- 1- Explain the following terms briefly: one-to-many relationship, many-to-many relationship, participation constraint, overlap constraint. (4marks)
- 2- List and explain four advantages of using a DBMS (3marks)
- 3- Does the relational model, as seen by an SQL query writer, provide physical and logical data independence? Explain. (3marks)
- 4- Why does a DBMS interleave the actions of different transactions instead of executing transactions one after the other? (5marks)



- 5- Consider the instance of the Students relation shown in Figure above.
- Give an example of an attribute (or set of attributes) that you can deduce is not a candidate key, based on this instance being legal. **(5marks)**
 - Is there any example of an attribute (or set of attributes) that you can deduce is a candidate key, based on this instance being legal? **(5marks)**

SECTION B: WEB AND MOBILE PROGRAMMING (50MARKS)

I. Web Programming (25 Marks)

- What are the advantages / disadvantages of various style methods? **(5marks)**
- List some necessities of using HTML forms. **(5marks)**
- How do I create frames? What is a frameset? **(5marks)**
- What are the form elements that support media content in HTML5? **(5marks)**
- How can page loading time be reduced? **(5marks)**

II. Mobile Programming (25 Marks)

- What Is the Google Android SDK? **(5marks)**
- Describe the Android Framework. **(5marks)**
- What is the importance of having an emulator within the Android environment? **(5marks)**
- Enumerate the three key loops when monitoring an activity. **(5marks)**
- Explain the proper way of setting up an Android-powered device for application development. **(5marks)**

RÉPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
.....
MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR
.....
COMMISSION NATIONALE D'ORGANISATION DE
L'EXAMEN HIGHER NATIONAL DIPLOMA EXAM (HND)
.....

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
.....
MINISTRY OF HIGHER EDUCATION
.....
NATIONAL COMMISSION FOR THE ORGANISATION OF
HIGHER NATIONAL DIPLOMA EXAM (HND) EXAM
.....

National Exam Of Higher National Diploma 2022 Session

Spécialty/Option: SWE, HWM, CWD, FSD

Paper : Digital Literacy

Duration : 2 hours

Credits : 1

SECTION A: GENERAL COMPUTER KNOWLEDGE (50MARKS)

QUESTION I: MCQ (20 MARKS)

1. Which of the following program is used for database on information?
 - a) MS Word
 - b) MS Excel
 - c) MS PowerPoint
 - d) MS Access
2. SRAM stands for
 - a) Standard Random Access Memory
 - b) Static Read Access Memory
 - c) StaticRandom Access Memory
 - d) Standard Read Access Memory
3. The process of getting information from the internet into the computer is known as
 - a) Downloading
 - b) Browsing
 - c) Uploading
 - d) Recording
4. The language used by a computer is called?
 - a) French language
 - b) Computer language
 - c) Binarylanguage
 - d) English language

5. You create a document by using Microsoft word 2010. You want to place a title in the center of the page, which feature can you use to do this?
- a) Font size
 - b) Font style
 - c) Spacing
 - d) Alignment
6. Nancy creates a business presentation by using Micro soft PowerPoint 2010. She saves it with the name presentation.ppt. Nancy opens the file to move the name changes, and she wants to save it with a different name. Which of the following commands on the file menu will he use to save the file with the different name?
- a) Save
 - b) Save As
 - c) Send to
 - d) Page setup
7. You create a presentation by using PowerPoint. Which of the following tool bars will you use to add geometric shapes to the presentation?
- a) Drawing
 - b) Formatting
 - c) Reviewing
 - d) Illustrations
8. Peripheral devices such as printers and monitors are?
- a) Information
 - b) Data
 - c) Software
 - d) Hardware
9. The other name of a mother board is
- a) Central board
 - b) System board
 - c) Computer board
 - d) Mouse
10. Computers that control processes and accept data in a continuous is
- a) Infiniteloop
 - b) Feedback loop
 - c) Data highway
 - d) Data traffic pattern

11. A Is used to read hand written or printed text to make a digital image that is stored in memory
- Touch pad
 - Lowerbeam
 - Printer
 - Scanner
12. A device for changing the connection on a converter to a different configuration is
- A converter
 - An adapter
 - An attachment
 - A component
13. The hardware device commonly referred to as the "brain" of the computer
- Secondary storage
 - CPU
 - Data input
 - RAM chip
14. are set of rules and procedures to control the data transmission over the internet
- IP address
 - Domains
 - Protocol
 - Gateway
15. Hardware or software designed to guard against unauthorized access to a computer network is known as
- Hacker-proof program
 - Firewall
 - Hacker-resistant server
 - Encryption firewall
16. What is the most common used to restrict access to a computer system?
- User logins
 - Password
 - Computer keys
 - Access control software

17. Malicious software is known as

- a) Badware
- b) Malware
- c) Maliciousware
- d) Illegalware

18. Which of the following does not store data permanently

- a) ROM
- b) RAM
- c) Floppy disk
- d) Hard drive

19. When a computer is switched on, the booting process performs

- a) Integrity test
- b) Power-on-self-test
- c) Correct functioning test
- d) Reliability test

20. Which is not basic function of a computer

- a) Store data
- b) Accept input
- c) Process data
- d) Copy test

QUESTION II: STRUCTURAL QUESTIONS (30 MARKS)

1. What does download mean? (2marks)
2. What does a graphic card do? (2marks)
3. What is the brain of a computer system? (2marks)
4. What is Microsoft windows? State two examples. (3marks)
5. List two operating system capabilities. (2marks).
6. List two operating system limitations. (2marks)
7. State two characteristics of hard disk drive. (2marks)
8. Differentiate between local area network and cloud computing. (2marks)
9. Which kind of hardware is used the most in the input phase of a computer base information system? (2marks)
10. What is the common measurement of units of a computer? (2marks)

11. What is the component that is used to both read and write data in a computer? (2marks)
12. How many important type of memory are important in a computer? List them. (2marks)
13. What does processing mean. (2marks)
14. How many types of user interface consist in a computer? List and define them. (3marks)

SECTION B: (50 MARKS)

Question I: Web Knowledge (20 Marks)

- a) Give the difference between.
 - i. Intranet and extranet (2marks)
 - ii. Internet browser and search engines(2marks)
 - iii. Static webpage and dynamic webpage (2marks)
- b) To create a static webpage we need two family of software. List them and give one example of each. (4marks)
- c) State any 4 social media platform.(4marks)
- d) What are the requirement to build the Wide Area Network. (4marks)
- e) What do you mean by the term URL? Define it. (2marks)

Question II: Digital Society (30 Marks)

1. Differentiate between e-learning and e-commerce. (4marks)
2. What is fake news? List two consequences of propagating fake news. (5marks)
3. Briefly explain the following in relation to the digital society.
 - a. Scamming
 - b. Hackers: a person who use his expertise to gain access to other people's computer to get information illegally or to damage it.
 - c. Cracking: It refers to electronic trespassing or criminal hacking
 - d. Programmer (4 x 2.5= 10marks)
4. Differentiate between tools and platform (3 marks)
5. Which device do you need to install on your computer in order to have a video conference with your friend? (2 marks)
6. What is the term for junk emails or unsolicited messages sent over the internet? (2 marks)

7. How do we call the process of confirming your username and password on the computer? **(2 marks)**
8. What is the fraudulent attempt to acquire sensitive information such as passwords and credit card details in an electronic communication? **(2 marks)**

RÉPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
.....
MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR
.....
COMMISSION NATIONALE D'ORGANISATION DE L'EXAMEN
HIGHER NATIONAL DIPLOMA EXAM (HND)

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
.....
MINISTRY OF HIGHER EDUCATION
.....
NATIONAL COMMISSION FOR THE ORGANISATION OF
HIGHER NATIONAL DIPLOMA EXAM (HND) EXAM

National Exam of Higher National Diploma 2022 Session

Specialty/option: Software Engineering (SWE)

Paper : Computer Technology

Duration : 4 hours

Credits : 6

Instructions: Answer all questions

Section A: Programming

40marks

1. C programs are converted into machine language with the help of

- a) An Editor
- b) A compiler
- c) An operating system
- d) None of the above .

2. A C variable cannot start with

- a) An alphabet
- b) A number
- c) A special symbol other than underscore
- d) both (b) and (c)

3. Which of the following is allowed in a C Arithmetic instruction

- a) []
- b) {}
- c) 0
- d) None of the above

4. HTML documents contain one root tag called

- a) HEAD
- b) Title
- c) Body
- d) HTML

5. Basic fundamental block is called
- html tag
 - html body
 - html attribute
 - html element
6. A field or column that uniquely identifies a row in a database table is a(n)?
- Variable
 - Identifies
 - Principal
 - Key
7. Which of the following is not a feature of most database management software?
- Sorting records in a table
 - Creating records
 - Preventing poorly designed tables
 - relating tables
8. before you can enter any data into a database table, you must do all of the following except?
- Determine the attribute the table will hold
 - Provide names for each attribute
 - Provides data types for each attribute
 - Determine minimum and maximum values for each attribute
9. You can extract subsets of data from database table using a(n)?
- Query
 - Sort
 - Investigation
 - Subroutine
10. A database table has the structure `tblphoneorders` (`ordernum`, `custName`, `custphoneNum`, `itemOrderd`, `quantity`). Which SQL statement could be used to extract all attributes for orders for item AB3333?
- `SELECT * FROM tblphoneorderd WHERE itemorderd = "AB3333"`
 - `SELECT tblphoneOrderds WHERE itemorderd = "AB3333"`
 - `SELECT itemOrderd FROM tblphoneOrders WHERE = "AB333"`
 - Two of these are correct

11. A network administrator is building a network for a small business that has 22 hosts. The ISP has assigned only one Internet routable IP address. Which IP address block can the network administrator use to address the network?

- a) 10.11.12.16 /28
- b) B. 172.31.255.128 /27
- c) 192.168.1.0 /28
- d) 209.165.202.128 /27

12. What subnet mask would be used with the hosts in the 128.107.176.0 /22 network?

- a) 255.0.0.0
- b) 255.248.0.0
- c) 255.255.252.0
- d) 255.255.255.0
- e) 255.255.255.252

13. You have been assigned the address block 10.255.255.224 /28 to create the network addresses for point-to-point WAN links. How many of these WANs can you support with this address block?

- a) 1
- b) 4
- c) 7
- d) 14

14. Which OSI layer is associated with IP addressing?

- a) 1
- b) 2
- c) 3
- d) 4

15. Which type of addressing is found at the OSI Layer 2? (Choose two.)

- a) Logical
- b) Physical
- c) MAC
- d) IP
- e) Port

16. A directed graph is if there is a path from each vertex to every other vertex in the digraph.
- Weakly connected
 - Strongly Connected
 - Tightly Connected
 - Linearly Connected
17. In the traversal we process all of a vertex's descendants before we move to an adjacent vertex.
- Depth First
 - Breadth First
 - With First
 - Depth Limited
18. State True or False. i) Network is a graph that has weights or costs associated with it. ii) An undirected graph which contains no cycles is called a forest. 7/17/2017 100 TOP iii) A graph is said to be complete if there is no edge between every pair of vertices.
- True, False, True
 - True, True, False
 - True, True, True
 - False, True, True
19. Inserting an item into the stack when stack is not full is called Operation and deletion of item form the stack, when stack is not empty is called operation.
- push, pop
 - pop, push
 - insert, delete
 - delete, insert
20. Is a pile in which items are added at one end and removed from the other.
- Stack
 - Queue
 - List
 - None of the above

21. scheduling is approximated by predicting the next CPU burst with an exponential average of the measured lengths of previous CPU bursts.

- a) multilevel queue
- b) RR
- c) FCFS
- d) SJF

22. A process control block should contain _____

- a) the process ID
- b) locations to store register values
- c) a list of all open files
- d) All of these responses are correct

23. The _____ multithreading model multiplexes many user-level threads to a smaller or equal number of kernel threads.

- a) many-to-one model
- b) one-to-one model
- c) many-to-many model
- d) many-to-some model

24. is the number of processes that are completed per time unit.

- a) CPU utilization
- b) Response time
- c) Turnaround time
- d) Throughput

25. Which of the following devices forwards data packets to all connected ports?

- a) Router
- b) Switch
- c) Bridge
- d) Hub

26. Of the following routing methods, which is likely to take the most amount of administration time in the long term?

- a) Static
- b) Link state
- c) Distance vector
- d) Dynamic

- 27.** Your manager asks you to look into some upgrades for your network. The current network is a 10Base2 system, and you have been experiencing numerous hard-to-track-down cable problems. As a result, you have decided to upgrade to a 10BaseT system. On the networking vendor's price list are both active and passive hubs. The passive hubs are considerably cheaper than the active ones, and you are tempted to opt for them so that you come in under budget. A colleague advises you against the purchase of passive hubs.
- 28.** What is the primary difference between an active and a passive hub?
- a) Passive hubs do not offer any management capabilities.
 - b) Passive hubs cannot be used in full-duplex mode.
 - c) Passive hubs do not regenerate the data signal.
 - d) Passive hubs forward data to all ports on the hub, not just the one for which they are intended.
- 29.** Which of the following statements best describes a gateway?
- a) It is a device that enables data to be routed from one network to another.
 - b) It is a term used to refer to any device that resides at the entrance of a network.
 - c) It is a device, system, or application that translates data from one format to another.
 - d) It is a network device that can forward or block data based on the MAC address embedded within the packet.
- 30.** Which operator is evaluated first?
- a) NOT
 - b) AND
 - c) XOR
 - d) OR
- 31.** How many return statements are allowed in a Function Procedure?
- a) 0
 - b) 1
 - c) 2
 - d) There is no limit
- 32.** What does your class can hold?
- a) data
 - b) functions
 - c) both a & b
 - d) none of the mentioned

33. What does inheritance allows you to do?

- a) create a class
- b) create a hierarchy of classes
- c) access methods
- d) None of the mentioned

34. Which of the following Information systems are aimed at improving the routine business activities on which all organizations depend?

- a) Management Information systems
- b) Decision support systems
- c) Transaction processing systems
- d) Management support systems

35. Which of the following strategies are adopted if information requirements are not well-defined?

- a) Rapid application development method
- b) Structured analysis development method
- c) Systems development life cycle method
- d) Prototyping method

36. Structured Programming involves:

- a) functional modularization
- b) localization of errors
- c) decentralized programming
- d) stress on analysis

37. Which of the following is not a fact-finding technique?

- a) Third party enquiry
- b) Interview
- c) Questionnaire
- d) Record reviews

38. In an E-R diagram attributes are represented by

- a) rectangle
- b) square
- c) ellipse
- d) triangle

39. In case of entity integrity, the primary key may be

- a) not Null
- b) Null
- c) both Null & not Null.
- d) any value.

40. Count function in SQL returns the number of

- a) values.
- b) distinct values.
- c) groups.
- d) columns.

SECTION B: (60MARKS)

A. Programming (20 Marks)

1. Distinguish between the following as seen in computer programming with examples if necessary
 - i. High level and low level programming language (1mk)
 - ii. C programming language and C++ (1mk)
 - iii. Program interpretation and program compilation (1mk)
2. Write a C code that computes the factorial of an integer n . When does the code fail (upper limit on n for the result to be correct) and why? (5mks)
3. Consider 2 three-dimensional vectors X and Y whose components are specified by the user and stored in 1D arrays. Write the C code that verify if the two vectors are orthogonal.
(two vectors a and b are orthogonal if their dot product $a.b$ is zero. If $a=x_1i + y_1j$ and $b=x_2i + y_2j$ then $a.b = x_1x_2 + y_1y_2$) (6mks)
4. Described App Widgets? (6mks)

B. Database (15 Marks)

1. What are the characteristics of a relational database? (6mks)
2. List five disadvantages of file processing. (5mks)

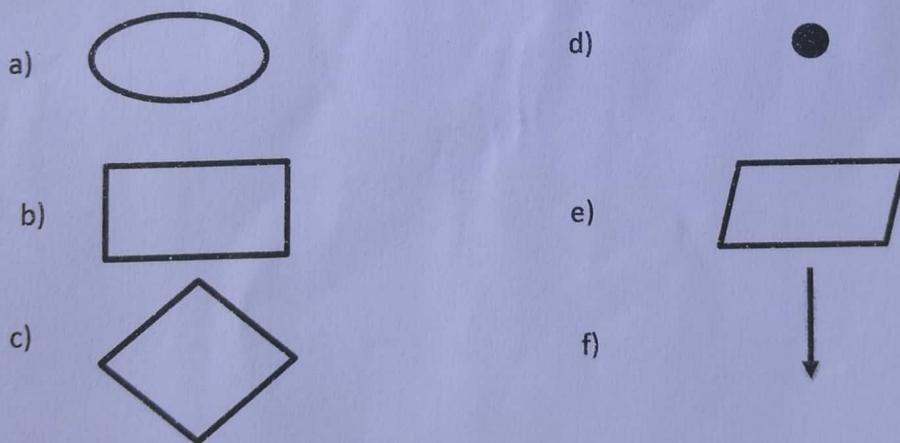
3. When would using a personal DBMS make sense? (2mks)
4. Describe what the term normalization means.
5. (2mks)

C. Networking (15 Marks)

1. What are the responsibilities of Application and Presentation Layer? (4mks)
2. Give the two classes of hardware building blocks? (2mks)
3. What are the different link types used to build a computer network? (2mks)
4. Establish, if there is any, link between the OSI model layers and the TCP/IP model layers. (5mks)
5. What are the categories of Transmission media? (2mks)

D. Algorithm and data structure 10marks

1. Define and explain the terms: Flowchart, Pseudocode, data type. (3mks)
2. Give the use of each of these symbols used in flowchart designing:(3mks)



3. Write an algorithm to find the largest value of 5 numbers in an array. (3mks)
4. Write an algorithm to search any number in an array. (3mks)