Diploma Programme
Programme du diplôme
Programa del Diploma

Computer science
Standard level
Paper 1

12 November 2025

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

1 hour 30 minutes

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer all questions.
- The maximum mark for this examination paper is **[70 marks]**.

8825 – 6407

5 pages

Section A

Answer **all** questions.

1. State **two** features of a computer language. [2]

2. Outline what is meant by the term failover system. [2]

3. Outline the purpose of a data flow diagram. [2]

4. Assume that integers are represented using 8 bits.

(a) State how many different values can be represented. [1]

(b) The hexadecimal representation of a particular integer is 7A.

State the binary representation of this integer. [1]

(c) The binary representation of a particular integer is 00011100.

State the hexadecimal representation of this integer. [1]

5. Consider the following integer array, `NUM`:

NUM [0]	[1]	[2]	[3]	[4]
7	1	5	9	6

and the following algorithm:

```
K = 0
loop while K < 4
    K = K + 1
    NUM[K] = NUM[K-1] + NUM[K]
end loop
NUM[0] = NUM[K] + NUM[0]
```

Copy and complete the following trace table: [5]

K	NUM[0]	NUM[1]	NUM[2]	NUM[3]	NUM[4]

6. Construct a logic diagram for the following expression:

X = NOT A OR NOT B AND C [4]

7. State **two** methods that can be used to improve the accessibility of systems. [2]

8. State the purpose of the memory data register (MDR) within a central processing unit (CPU). [1]

9. Identify **two** characteristics of fibre-optic cables. [2]

10. Virtual machines provide a software emulation of other operating systems.

Outline **one** reason for using a virtual machine in the testing and development of apps. [2]

Section B

Answer **all** questions.

11. An organization replaced its local area network (LAN) with a wireless local area network (WLAN).

(a) Identify **three** hardware components of a WLAN. [3]

(b) Outline **two** advantages of a WLAN for the organization. [4]

A WLAN will introduce many cybersecurity risks.

(c) Describe **two** ways in which the organization can avoid unauthorized interception issues. [4]

The organization allows employees to connect to the network from their homes.

(d) Explain how a virtual private network (VPN) allows employees full functionality as well as secure access to the organization's network. [4]

12. A company's new computer system is being developed.

(a) The system analyst decided to use direct observation as a method of gathering data about processes that are carried out.

(i) Identify **two** advantages for the system analyst of using direct observation to gather this data. [2]

(ii) State **one** method of gathering data from end-users **other than** direct observation. [1]

(iii) Identify **two** advantages for the system analyst of using the method stated in part (a)(ii). [2]

A prototyping approach is being used to develop the new computer system.

(b) (i) Outline **one** advantage of prototyping. [2]

(ii) Outline **one** disadvantage of prototyping. [2]

The company's management is considering whether all its data will be stored locally or remotely using a cloud service.

(c) Compare and contrast local storage and cloud storage in terms of data security, cost, and accessibility. [6]

13. The concentration of an air pollutant has been measured periodically, and the measurements are stored in a collection.

(a) Outline what is meant by the term collection. [2]

The collection `PLTNT` holds the following pollutant concentration values:

100 30 10 20 50 100 250 50

The range of pollutant concentration values is from 0 to 500.

The following algorithm in pseudocode is intended to output **all** elements stored in the collection `PLTNT`:

```
PLTNT.resetNext()
while PLTNT.hasNext()
    X = PLTNT.getNext()
    output (PLTNT.getNext())
end loop
```

(b) (i) Describe why this algorithm does not work as intended. [2]

(ii) Construct the correct algorithm in pseudocode. [2]

(c) Construct an algorithm in pseudocode that outputs the maximum, minimum, and average pollutant concentrations stored in the collection `PLTNT`.

For example, using the data stored in the collection `PLTNT`, the algorithm should output:

- Maximum pollutant concentration: 250
- Minimum pollutant concentration: 10
- Average pollutant concentration: 76.25 [9]