Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

COMPUTER SCIENCE **9618/12**

Paper 1 Theory Fundamentals **October/November 2025**

1 hour 30 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use an HB pencil for any diagrams, graphs or rough working.
- Calculators must **not** be used in this paper.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [ ].
- No marks will be awarded for using brand names of software packages or hardware.

This document has **16** pages.

[Turn over

1 Draw **one** line from each verification method to indicate whether it is used during data transfer or data entry.

Verification Method	Use
Parity byte check	
Checksum	Data transfer
Visual check	
Parity block check	Data entry

[2]

2 **(a)** Complete the table by describing each term.

Term	Description
Copyright	....
Open Source (Initiative)	....
Shareware	....
Software Licence	....

[4]

(b) Describe the purpose of a code of conduct.

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..... [2]

3 **(a)** **(i)** State what is meant by relative addressing.

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..... [1]

(ii) Registers such as the Accumulator (ACC) and the Index Register (IX) are used in the CPU.

Identify **two** special purpose registers used in the CPU. Do **not** include the ACC or IX in your answers.

1 .....

2 .....

[2]

(b) The following table shows part of the instruction set for a processor. The processor has two registers: the ACC and an IX.

Instruction		Explanation
Opcode	**Operand**	
LDM	#n	Immediate addressing. Load the number n to ACC
LDD	<address>	Direct addressing. Load the contents of the location at the given address to ACC
LDI	<address>	Indirect addressing. The address to be used is at the given address. Load the contents of this second address to ACC
LDX	<address>	Indexed addressing. Form the address from <address> + the contents of the index register. Copy the contents of this calculated address to ACC
LDR	#n	Immediate addressing. Load the number n to IX
<address> can be an absolute or symbolic address # denotes a denary number, e.g. #127		

The current contents of the main memory and the index register are shown.

Address	Instruction
98	8
99	16
100	3
101	98
102	32
IX	2

Write the contents of the ACC after each instruction is executed.

Instruction	Value in ACC
LDM #98	
LDI 101	
LDX 100	

[3]

(c) A student buys a new computer. The table shows the specifications of the old computer and the new computer.

Old computer	New computer
1.8 GHz dual core processor	2.3 GHz dual core processor
16 MB cache	32 MB cache

Explain why increasing the clock speed **and** increasing the cache memory will improve the performance of the computer.

Clock speed .....

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Cache memory .....

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.....

[4]

4 A relational database, SHIPPING, stores data about the ships in a company and the containers that are carried on the ships.

The database has the following tables:

CONTAINER(ContainerID, Type, Weight, OwnerName, ShipID)

SHIP(ShipID, Type, Capacity, ShipName)

(a) Describe the relationship between the two tables. Refer to the primary and foreign keys in your answer.

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..... [2]

(b) The table CONTAINER needs an additional field to store the data for the last inspection date.

Write a Structured Query Language (SQL) script to add **one** field to the table CONTAINER to store the date of last inspection of the container, for example 08/07/2019.

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..... [2]

(c) Write an SQL script to return the number of containers stored in the database for the ship with the name Caledonia.

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..... [4]

(d) Describe the purpose of a developer interface in a Database Management System (DBMS).

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..... [2]

5 A local area network (LAN) has five computers, one switch and one server.

(a) Describe the characteristics of a LAN.

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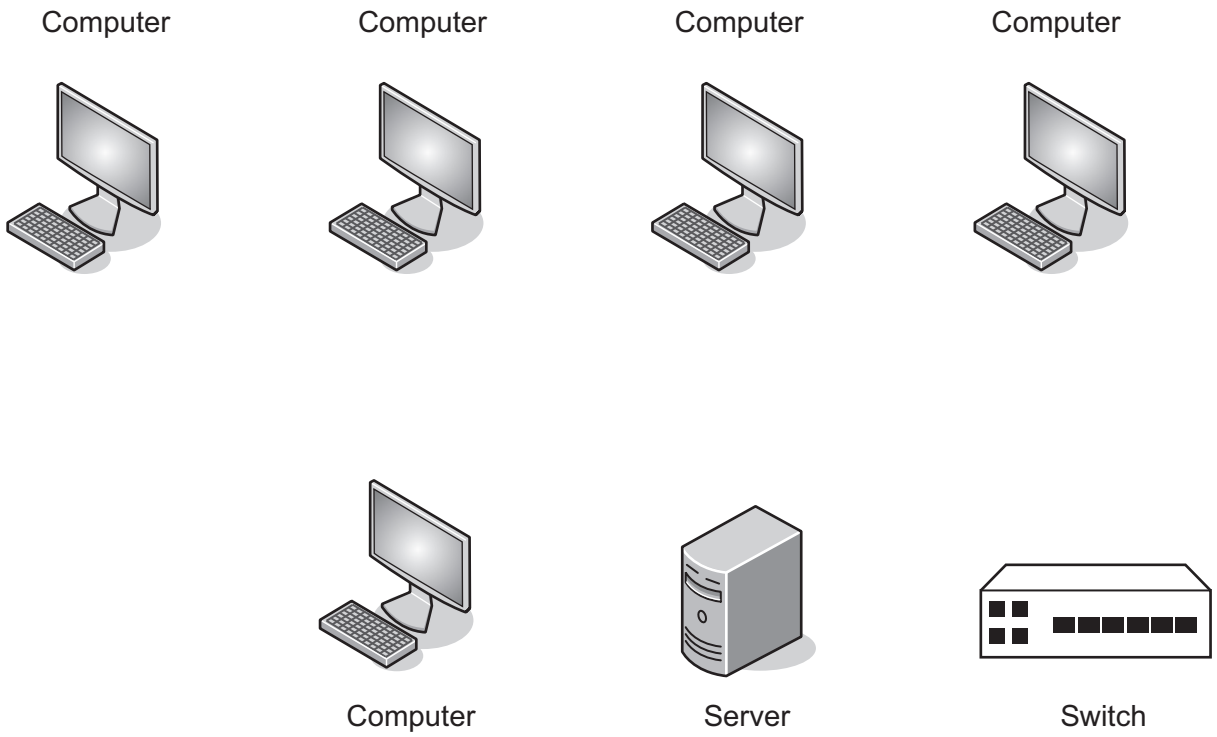
..... [2]

(b) Complete the following diagram to show how these devices are connected in a star topology.



[2]

(c) Describe how packets are transmitted between two hosts using a star topology.

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..... [3]

(d) Another type of network is a bus network.

Ethernet is used to transmit and receive data between the devices on the bus network.

Describe how collisions are detected and managed on this network.

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..... [3]

(e) Complete the table by identifying **one** threat to computer and data security posed by networks and the internet.

Describe the threat and give a method of prevention.

Threat	Description	Prevention
.....	.....	.....
.....	.....	.....

[3]

6 **(a)** A sound file is compressed by reducing the sampling rate.

State whether this is lossless or lossy compression. Justify your choice.

Type of compression .....

Justification .....

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.....

[1]

(b) The following table shows some words and corresponding denary values.

Word	Denary value
Computing	55
Science	56
Computers	57
are	58
Brilliant!	59
is	60
Fun!	61
Amazing!	62

The following table shows three bytes of data that have been received.

Use the table to find the corresponding words from the binary values received.

Binary value	00111000	00111100	00111110
Word			

Working .....

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.....

.....

[1]

(c) A computer system uses even parity. The least significant (rightmost) bit of each byte is the parity bit.

(i) Complete the byte by writing the missing parity bit:

							parity bit ↓
0	1	0	1	1	1	0	

[1]

(ii) The computer also uses parity block check. The parity block check uses even parity. Computer A transmits four bytes of data to computer B, followed by a parity byte. Computer B receives the following sequence of bytes.

								parity bit ↓
	1	0	1	1	0	1	1	1
	0	1	1	1	0	0	0	0
	0	0	0	1	1	0	1	1
	0	1	1	1	0	1	0	0
parity byte →	1	0	1	0	0	0	0	0

Following transmission, one of the four bytes of data has an error in one of the bits.

Circle the bit that has been altered during the data transfer. [1]

(d) A bitmap image has a resolution of 1000 pixels wide by 2000 pixels high. The colour depth is 16 bits.

Calculate an estimate of the file size in megabytes.

Show your working.

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File size ..... megabytes

[2]

7 **(a)** The following binary addition is performed using 8-bit registers.

Complete the calculation using binary addition.

1 0 0 0 0 1 1 1

+ 0 0 1 1 1 0 0 1

[1]

(b) A computer uses the Unicode character set.

State the number of bits used to store **one** character from the Unicode character set.

..... [1]

(c) ASCII is another character set. The ASCII value for the character 'h' has the denary value 104.

(i) Write the Binary Coded Decimal (BCD) value for the ASCII character 'h'.

..... [1]

(ii) Write the hexadecimal value for the ASCII character 'h'.

..... [1]

8 A restaurant accesses software and stores data using cloud computing.

(a) (i) Give **two** benefits of storing data using cloud computing.

1 .....

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2 .....

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[2]

(ii) Give **two** drawbacks of using cloud computing.

1 .....

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2 .....

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[2]

(b) The restaurant uses touchscreens as input devices to allow staff to select items from a menu.

(i) Explain how a touchscreen converts the point of touch to a selection from the menu.

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..... [4]

(ii) The image files that are displayed on the touchscreen have been corrupted.

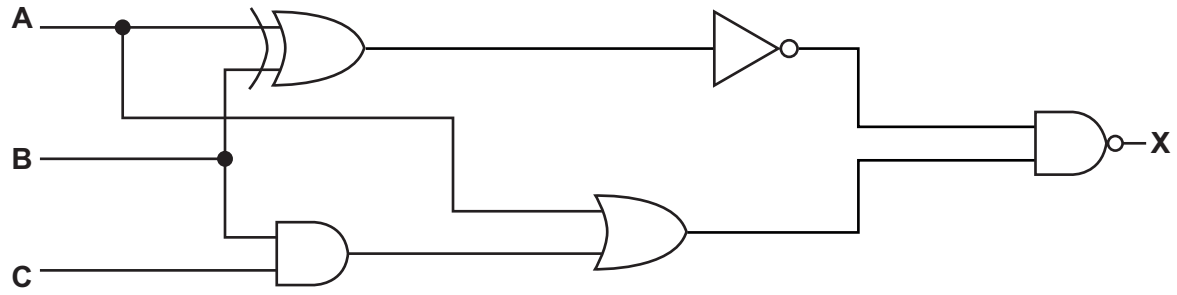
Identify **two** examples of utility software that could be used to recover the images.

1 .....

2 .....

[2]

9 **(a)** Consider the following logic circuit:



Write the logic expression for the logic circuit. Do **not** simplify the expression.

X = ... [2]

(b) Consider the following logic expression:

X = NOT ((**A** NAND **B**) XOR (NOT **A** OR NOT **C**))

A truth table for the logic expression is given:

Row number	A	B	C	X
1	0	0	0	1
2	0	0	1	0
3	0	1	0	1
4	0	1	1	0
5	1	0	0	1
6	1	0	1	0
7	1	1	0	1
8	1	1	1	1

There are **three** errors in the truth table.

Identify the **three** errors in the truth table by writing the row numbers with an incorrect output.

Error 1 Row number .....

Error 2 Row number .....

Error 3 Row number .....

[2]

10 A programmer is developing a computer program.

(a) Explain how the programmer can first use an interpreter **and** then a compiler to develop the computer program.

Interpreter .....

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Compiler .....

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[4]

(b) The programmer releases the program as Free Software.

Describe what is meant by Free Software.

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..... [2]

(c) A user downloads the computer program from the internet.

State what should be included as part of the download to make sure the program is authentic.

..... [1]

11 An automated system opens doors when a person is detected within 2 metres. The system closes the doors when there is no longer a person within 2 metres.

Identify whether the automated system is an example of a monitoring system or a control system.

Justify your choice.

Monitoring or Control .....

Justification .....

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..... [3]