Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

1927141116

COMPUTER SCIENCE **9608/11**

Paper 1 Theory Fundamentals **October/November 2021**

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. Any blank pages are indicated.

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1 An image can be either a bitmap image or a vector graphic.

(a) Vector graphics are made up of drawing objects and their properties.

(i) State what is meant by a **drawing object**.

.....

..... [1]

(ii) Identify **four** properties of a **drawing object**.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

.....

[4]

(b) Identify **three** items that are stored in a **bitmap** file header.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

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(c) A bitmap image needs to be compressed before it can be sent by email.

Describe **one** lossy and **one** lossless method of compressing the image.

Lossy .....

.....

.....

.....

.....

Lossless .....

.....

.....

.....

.....

[4]

2 Joanne wants to record sound files and videos for uploading to a social media website.

(a) The following table contains terms about sound representation and encoding.

Complete the table by writing the definitions for each term.

Term	Definition
Sampling	....
Sampling resolution	....
Sampling rate	....

[3]

(b) Joanne records a short video using interlaced encoding.

Describe what is meant by **interlaced encoding**.

.....

.....

.....

..... [2]

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3 Server-side scripting is used to access a company database over the Internet.

Steps 1 to 6 describe the sequence of events.

Four of the statements **A**, **B**, **C**, **D**, **E** and **F** are used to complete the sequence.

Letter	Statement
A	The web server processes the PHP code.
B	The server renders the HTML code and displays the web page.
C	The browser renders the HTML code and displays the web page.
D	The web server returns the (HTML) web page to the client web browser.
E	The web server accesses the page from its hard disk.
F	The web browser processes the PHP code.

Write **one** of the letters **A** to **F** in each appropriate row to complete the sequence.

1. The browser requests the web page from the web server.
2. .....
3. .....
4. The web server produces the HTML code for the web page.
5. .....
6. .....

[4]

4 Oliver needs to increase the secondary storage on his computer. He already has several hard disks.

(a) Identify **two other** secondary storage devices that Oliver could use. Each device must be different.

1 .....

2 .....
[2]

(b) Oliver needs a scanner to make digital copies of some paper documents.

Describe the basic internal operation of a scanner.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(c) Oliver wants to upgrade the RAM in his computer. He is not sure whether his computer has Static RAM (SRAM) or Dynamic RAM (DRAM).

Draw **one or more** lines from each type of RAM to its appropriate description(s).

Type of RAM	Description
	Is less expensive to manufacture
SRAM	Needs to be refreshed
	Has more complex circuitry
DRAM	Is often used as cache
	Has faster access time

[2]

5 Complete the truth table for the following logic expression:

X = NOT(**A** OR **B**) AND NOT(NOT(**B** OR **C**) AND (NOT **A**))

A	**B**	**C**	**Working space**	**X**
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

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6 **(a)** Complete the following sentences that describe parts of a processor in a Von Neumann model for a computer system.

There are ..... buses that transfer data between components in a computer system.

The width of the ..... determines the number of directly accessible memory locations.

The ..... sends signals on the ..... to direct the operation of system components.

..... pulses are used to synchronise the components on the motherboard. [5]

(b) Describe the stages of the fetch-execute (F-E) cycle.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

7 **(a)** A computer has an operating system (OS).

(i) State **three** memory management tasks performed by the OS.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(ii) State **two** input/output device management tasks performed by the OS.

1 .....

.....

2 .....

.....

[2]

(b) Utility programs are also provided with the OS.

Identify **and** describe **two** different utility programs.

Utility program .....

Description .....

.....

Utility program .....

Description .....

.....

[4]

(c) Some operating systems include library programs.

State **three** benefits to a programmer of using library programs.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

8 The following table shows part of the instruction set for a processor. The processor has one general purpose register, the Accumulator (ACC), and an Index Register (IX).

Instruction		Explanation
Op code	**Operand**	
LDD	<address>	Direct addressing. Load the contents of the location at the given address to the ACC
LDI	<address>	Indirect addressing. The address to be used is at the given address. Load the contents of this second address to the ACC
STO	<address>	Store the contents of the ACC at the given address
ADD	<address>	Add the contents of the given address to the ACC
INC	<register>	Add 1 to the contents of the register (ACC or IX)
JMP	<address>	Jump to the given address

The current contents of the main memory are:

Address	Instruction
130	LDI 160
131	ADD 153
132	STO 153
133	LDD 160
134	INC ACC
135	STO 160
136	JMP 130
…	
150	13
151	23
152	11
153	0
…	
160	150

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Complete the trace table for **two iterations** of the loop.

Instruction address	ACC	Memory address				
		150	151	152	153	160
		13	23	11	0	150

[4]

9 An airline company uses a relational database to store data about passengers and flights.

Part of the database is shown.

PASSENGER(PassengerID, FirstName, LastName)

FLIGHT(FlightID, FlightDate, FlightTime)

PASSENGER_LIST(FlightID, PassengerID, SeatNo)

(a) Complete the entity-relationship (E-R) diagram to show the relationships between the given tables.



[2]

(b) The following is example data for the table FLIGHT:

FlightID	FlightDate	FlightTime
MO126	05/05/21	09:00
GK6708	06/09/21	00:30
BA0897	08/12/21	15:30

Write Data Definition Language (DDL) statements to define the table FLIGHT.

.....

.....

.....

.....

.....

.....

..... [5]

10 Janaka is developing a new computer program. She decides to use an interpreter instead of a compiler.

(a) State **three** benefits of using an interpreter.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(b) State **one** drawback of using an interpreter.

.....

..... [1]

11 The Internet uses a client-server model.

(a) Describe the role of clients and servers on the Internet.

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.....

..... [2]

(b) Computers on the Internet have IP addresses.

Describe the format of an IP address.

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..... [3]

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