Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

COMPUTER SCIENCE **0478/12**

Paper 1 Theory **May/June 2017**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

No calculators allowed.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
No marks will be awarded for using brand names of software packages or hardware.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The maximum number of marks is 75.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **12** printed pages.

1 Name **three** different buses that are used in the fetch-execute cycle.

Bus 1 .....

Bus 2 .....

Bus 3 .....

[3]

2 Give **two** examples of primary, secondary and off-line storage.

Primary

Example 1 .....

Example 2 .....

Secondary

Example 1 .....

Example 2 .....

Off-line

Example 1 .....

Example 2 .....

[6]

3 The diagram shows **five** output devices and **five** descriptions.

Draw a line between each output device and its description.

Output Device	Description
Inkjet printer	Flat panel display that uses the light modulating properties of liquid crystals.
LCD screen	Flat panel display that uses an array of light-emitting diodes as pixels.
2D cutter	Droplets of ink are propelled onto paper.
LED screen	Electrically charged powdered ink is transferred onto paper.
Laser printer	High powered laser that uses the x-y plane.

[4]

[Turn over

4 There are various methods used to detect errors that can occur during data transmission and storage.

Describe each of the following error detection methods.

Parity check .....

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Check digit .....

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Checksum .....

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Automatic Repeat request (ARQ) .....

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[8]

5 **(a)** The denary number 57 is to be stored in two different computer registers.

Convert 57 from denary to binary and show your working.

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.....[2]

(b) Show the binary number from **part (a)** as it would be stored in the following registers.


Register 1


Register 2

[2]

(c) A binary number stored in a register can have many different uses, for example an address in main memory.

Give **two** other uses for a binary number stored in a register.

Use 1 .....

Use 2 .....

[2]

(d) A register in a computer contains binary digits.

0	**0**	**1**	**1**	**1**	**0**	**1**	**0**

The contents of the register represent a binary integer.

Convert the binary integer to hexadecimal.

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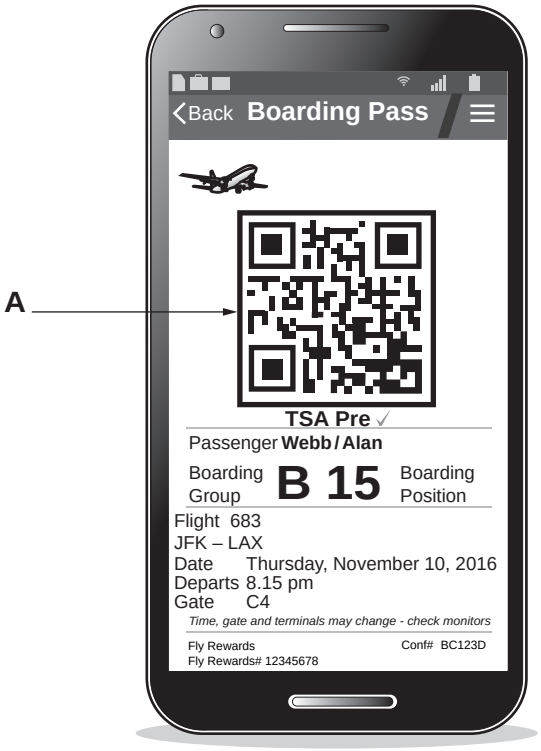
.....[1]

6 Airline boarding passes can be read from a smartphone instead of a printout.



Identify what type of barcode **A** is an example of. Explain how the data stored in this type of barcode is read.

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.....[4]

7 Computer A is communicating with computer B.

(a) Draw an arrow or arrows to show simplex, duplex and half-duplex data transmission. The **direction** of the data transmission must be fully **labelled**.

Simplex data transmission

Computer **A**

Computer **B**

Duplex data transmission

Computer **A**

Computer **B**

Half-duplex data transmission

Computer **A**

Computer **B**

[6]

(b) State a use for the following data transmission methods. The use must be different for each data transmission method.

Simplex .....

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Duplex .....

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[2]

(c) A computer includes an Integrated Circuit (IC) and a Universal Serial Bus (USB) for data transmission.

Describe how the computer uses these for data transmission, including the type of data transmission used.

IC .....

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USB .....

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[4]

8 A company has a number of offices around the world.

(a) Data is transmitted between the offices over the Internet. In order to keep the data safe the company is using Secure Socket Layer (SSL) protocol and a firewall at each office.

Explain how SSL protocol and a firewall will keep the company's data safe.

SSL protocol .....

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Firewall .....

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[4]

(b) A company stores personal details of its customers on a computer system behind a firewall.

Explain, with reasons, what else the company should do to keep this data safe.

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9 A cold store is kept at a constant low temperature using a sensor, a microprocessor and a cooling unit.

Explain how the sensor and microprocessor will maintain a constant low temperature.

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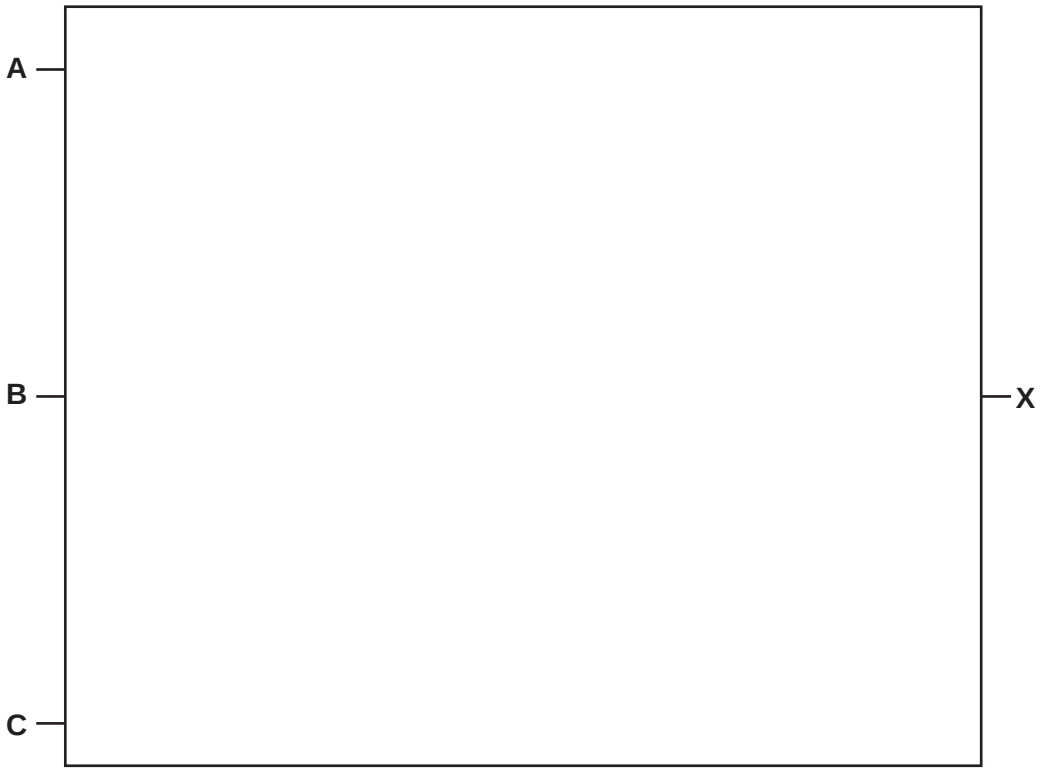
10 For this logic statement:

X = 1 if ((A is 1 AND B is 1) OR (B is 1 AND C is NOT 1))

(a) Draw the logic circuit.



[4]

(b) Complete the truth table for the given logic statement.

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]

11 A company sells smartphones over the Internet.

Explain how the information stored on the company's website is requested by the customer, sent to the customer's computer and displayed on the screen.

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.....[7]