Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

9657726305

COMPUTER SCIENCE **9608/11**

Paper 1 Theory Fundamentals **May/June 2018**

1 hour 30 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.

This document consists of **15** printed pages and **1** blank page.

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Question 1 begins on the next page.

1 Four communication media and five features are shown.

Draw one or more lines from each communication media to the appropriate feature(s).

Communication media	**Feature**
Fibre-optic cable	Can be twisted pair or co-axial
Radio waves	Transmits light pulses
Copper cable	Large range of wavelengths
Satellite	Least likely to have interference
	Wireless transmission

[6]

2 A logo is designed as a bitmap image.

(a) Describe what is meant by a **bitmap image**.

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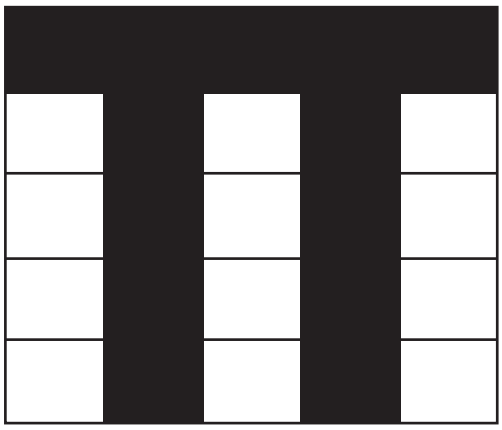
.....[2]

(b) A black and white bitmap image is shown.



(i) Explain how a computer can store this bitmap image.

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.....[2]

(ii) The image is compressed before it is attached to an email.

Explain how run-length encoding (RLE) will compress the image.

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.....[2]

(c) The finished logo is 500 pixels by 1000 pixels and uses 35 different colours.

Estimate the file size for the logo. Give your answer in kilobytes. Show your working.

Working .....

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Answer .....

[4]

(d) The logo is redesigned as a vector graphic.

State **two** benefits of a vector graphic compared to a bitmap image. Give a reason for each benefit.

Benefit 1 .....

.....

Reason 1 .....

.....

Benefit 2 .....

.....

Reason 2 .....

.....

[4]

[Turn over

3 An operating system (OS) is usually pre-installed on a new computer.

(a) The OS performs a number of different tasks such as memory management and security management.

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

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(ii) State **three** security management tasks the OS performs.

1 .....

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2 .....

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3 .....

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[3]

(iii) State **two** tasks, other than memory management and security management that are carried out by an OS.

1 .....

.....

2 .....

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[2]

(b) Utility software is usually pre-installed on a new computer.

The following table lists four programs. Put **one** tick (✓) in each row to indicate whether or not the program is utility software.

Program	True	False
Disk Defragmenter		
Word Processor		
Library Program		
Compression Software		

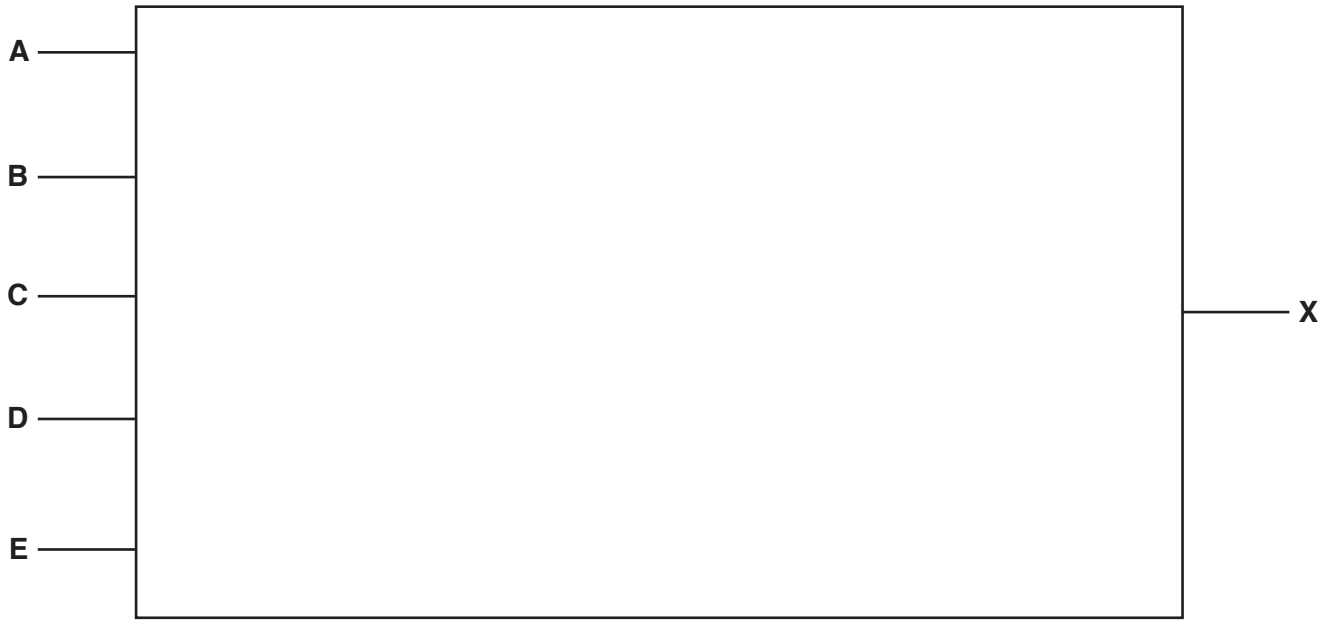
[4]

4 **(a)** An alarm system (X) is enabled and disabled using either a switch (A) or a remote control (B). There are **two** infra-red sensors (C, D) and **one** door pressure sensor (E).

Parameter	Description of parameter	Binary value	Condition
A	Switch	1	Switch enabled
		0	Switch disabled
B	Remote control	1	Remote enabled
		0	Remote disabled
C	Infra-red sensor	1	Activated
		0	Not activated
D	Infra-red sensor	1	Activated
		0	Not activated
E	Door pressure sensor	1	Activated
		0	Not activated

The alarm sounds (X = 1) if the alarm is enabled **and** any one or more of the sensors is activated.

Draw a logic circuit to represent the alarm system.



[3]

(b) Complete the truth table for the logic expression: **X** = **A** OR (**B** XOR **C**)

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]

[Turn over

5 A college has a client-server network.

(a) The college has a file server and other servers.

State the purpose of **two** other servers in the college network.

Server 1 .....

Server 2 .....

[2]

(b) The students use the network to access the Internet.

One student stated, '*The Internet and the World Wide Web are the same thing*'.

Tick (✓) **one** box to indicate whether this statement is true or false.

True	False

Justify your choice.

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.....[5]

(c) Students use the college's learning resource website. Several of the web pages include PHP script.

Describe the sequence of events when a student requests a web page with embedded server-side code.

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.....[4]

6 Parity bits can be used to verify data.

(a) The following binary number is transmitted using **even** parity.

Add the missing parity bit.

Parity bit							
	1	0	1	1	0	1	0

[1]

(b) In the following parity block, the first column contains the parity bits, and the last row contains the parity byte. A device transmits the data using **even** parity.

(i) Circle the error in the data transmitted.

	Parity bit	**Data**						
	1	1	0	1	0	1	1	1
	1	0	0	0	1	1	1	0
	0	1	0	0	1	0	1	1
	1	1	1	0	1	1	1	1
Parity byte	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**1**

[1]

(ii) Explain how you identified the error.

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.....[2]

(c) The data received can contain errors that are not detected using parity bits.

Explain how this can happen.

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.....[2]

(d) Parity is not the only method to verify the data has been sent correctly.

Name **and** describe **one** other method of data verification during data transfer.

Name .....

Description .....

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[3]

7 A student plays computer games on a games console.

(a) Identify **two** input devices and **one** output device used in a games console.

Input device 1 .....

Input device 2 .....

Output device .....

[3]

(b) The games console has random access memory (RAM) and read only memory (ROM).

(i) State **two** differences between RAM and ROM.

Difference 1 .....

.....

Difference 2 .....

.....

[2]

(ii) Give **one** use for RAM in the games console.

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.....[1]

(iii) Give **one** use for ROM in the games console.

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.....[1]

8 The Von Neumann model uses a series of registers.

(a) Explain what is meant by the term **register**.

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.....[2]

(b) **(i)** Explain the purpose of the Memory Data Register (MDR).

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.....[2]

(ii) Name **two** registers, other than the MDR, that are used in the fetch-execute cycle.

Register 1 .....

Register 2 .....

[2]

(c) X is a register. The current contents of X are:

1	0	0	0	0	1	1	1

(i) The current contents of register X represent an unsigned binary integer.

Convert the value in X into denary.

.....[1]

(ii) The current contents of register X represent a Binary Coded Decimal.

Convert the value in X into denary.

.....[1]

(iii) The current contents of register X stores a two's complement binary integer.

Convert the value in X into denary.

.....[1]

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