Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

5949952513

COMPUTER SCIENCE **0478/12**

Paper 1 Theory **October/November 2015**

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 on all the work you hand in.
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.

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1 There are a number of security risks associated with using the Internet.

Name **three** of these risks. For each, state why it is a risk and describe how the risk can be minimised.

Security risk 1 .....

Why it is a risk .....

.....

.....

How to minimise the risk .....

.....

.....

Security risk 2 .....

Why it is a risk .....

.....

.....

How to minimise the risk .....

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.....

Security risk 3 .....

Why it is a risk .....

.....

.....

How to minimise the risk .....

.....

.....

[9]

2 Seven computer terms and seven descriptions are shown below.

Draw a line to link each computer term to its most appropriate description.

Computer term	Description
Interface	Reduction of file size by permanently removing some redundant information from the file
Interrupt	File compression format designed to make photo files smaller in size for storage and for transmission
JPEG	File compression system for music which does not noticeably affect the quality of the sound
Lossless compression	Hardware component that allows the user to communicate with a computer or operating system
Lossy compression	The file is reduced in size for transmission and storage; it is then put back together again later producing a file identical to the original
MIDI	Signal sent to a processor which may cause a break in execution of the current routine, according to priorities
MP3 format	Standard adopted by the electronic music industry for controlling devices such as synthesisers and sound cards

[6]

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[Turn over

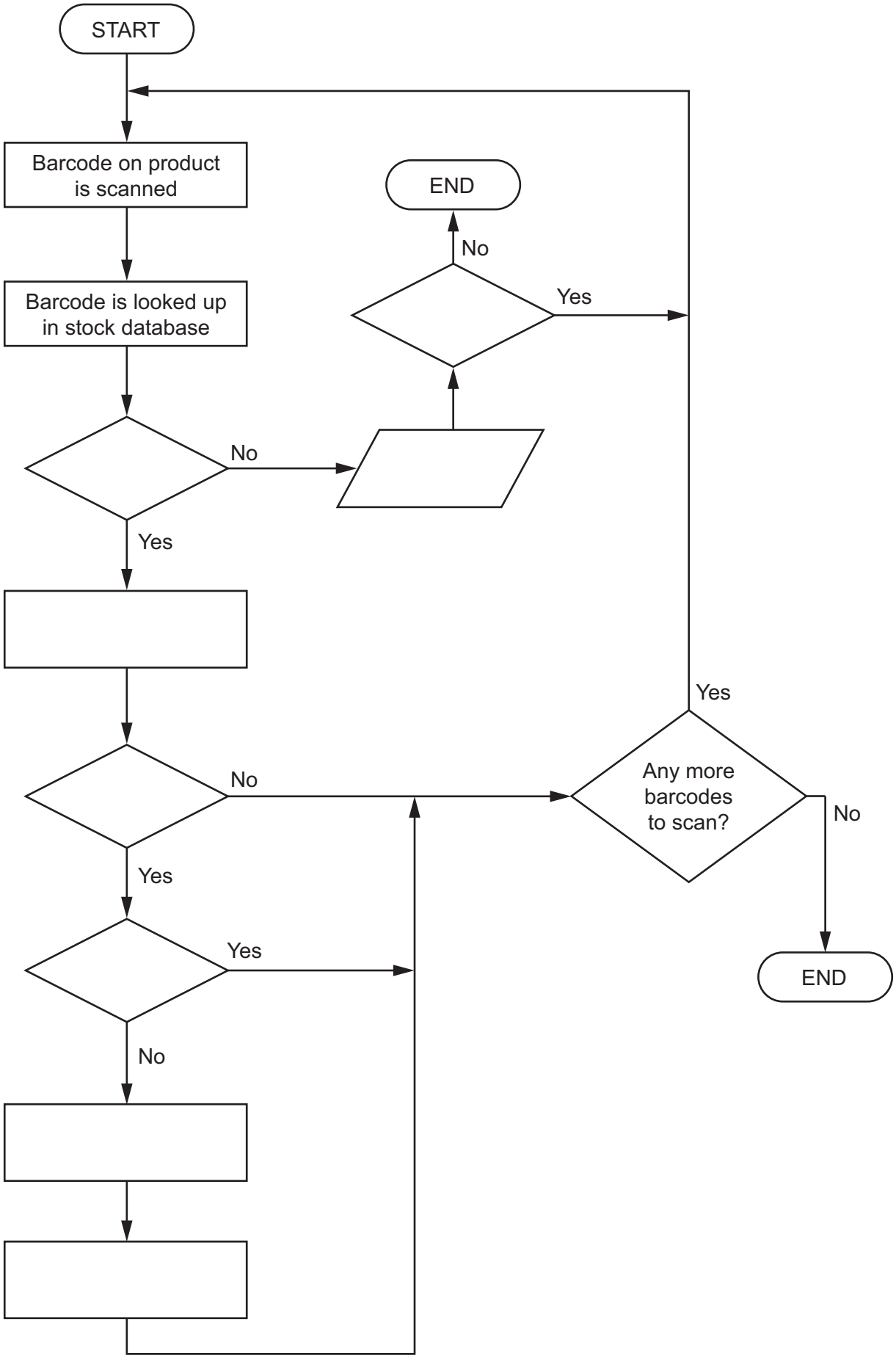
3 The flowchart on the opposite page shows what happens when the barcode on a product is scanned at the checkout in a supermarket. The barcodes are used in an automatic stock control system.

Several of the statements in the flowchart are missing.

Using **item number only** from the list below, complete the flowchart.

Item number	Statement
1	Add flag to product record to indicate re-order made
2	Any more barcodes to scan?
3	Has the scanned barcode been found in the file?
4	Has the re-order flag already been added to the product record?
5	Is number of product in stock <= re-order level?
6	Number of product in stock is reduced by 1
7	Output an error message
8	Automatically send out order for new product

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START
Barcode on product is scanned
Barcode is looked up in stock database
No
Yes
Yes
No
No
Yes
Yes
No
Yes
No
END
No
Yes
Any more barcodes to scan?
No
END

[4]

4 (a) (i) Convert the following **two** hexadecimal numbers into binary:

F A 7
D 3 E

F A 7 | | | | | | | | | | | |

D 3 E | | | | | | | | | | | |

[4]

(ii) Now perform the AND (logic) operation on each corresponding pair of binary bits in the two numbers from **part (i)**.

| | | | | | | | | | | | |

[2]

(iii) Convert your answer in **part (ii)** into hexadecimal.

.....

.....

[2]

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(b) (i) The following code shows HTML 'tag' pairs on either side of the text stating the colour that each creates.

```
<font color " # F F 0 0 0 0 " > RED </font>
<font color " # 0 0 F F 0 0 " > GREEN </font>
<font color " # 0 0 0 0 F F " > BLUE </font>

<font color " #      X      " > YELLOW </font>
<font color " #      Y      " > MAGENTA </font>
<font color " #      Z      " > CYAN </font>
```

Yellow is a combination of red and green, magenta a combination of red and blue and cyan a combination of green and blue.

State what 6-digit hexadecimal values should replace X, Y and Z in the above code.

X .....

Y .....

Z .....

[3]

(ii) Describe how other colours, such as a darker shade of blue, are created.

.....

.....

.....

[2]

(c) 1A – 16 – C5 – 22 – FF – FF is an example of a MAC address.

(i) Identify what the first six and last six hexadecimal digits represent.

First six digits .....

.....

.....

Last six digits .....

.....

.....

[2]

(ii) State why MAC addresses are used.

.....

.....

[1]

5 A security system uses sensors, a camera and a microprocessor to capture images of each person entering a large shopping mall.

(a) Describe how the sensors, camera and microprocessor interact to identify certain people entering the mall.

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[5]

(b) Each image taken requires 1 MB of storage. If the camera captures an image every 5 seconds over a 24 hour period, how much storage is required?

Give your answer in **gigabytes** and show all your working.

.....

.....

.....

.....

[2]

(c) The shopping mall has over 100 cameras. At the end of each day all these cameras send their images, captured over the last 24 hours, to a central computer.

Explain why the mall uses dedicated fibre optic cable rather than transmitting the data over the local broadband network.

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[2]

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6 **(a)** Explain what is meant by HTML.

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..... [3]

(b) HTML uses both structure and presentation.

Describe what is meant by the two terms.

Structure .....

.....

.....

Presentation .....

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.....
[2]

(c) Explain the function of a web browser.

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.....[3]

7 **(a)** Check digits are used to ensure the accuracy of input data.

A 7-digit code number has an extra digit on the right, called the check digit.

Digit position	1	2	3	4	5	6	7	8
Digit	–	–	–	–	–	–	–	–

The check digit is calculated as follows:

- each digit in the number is multiplied by its digit position
- the seven results are then added together
- this total is divided by 11
- the remainder gives the check digit (if the remainder = 10, the check digit is X)

(i) Calculate the check digit for the following code number. Show all your working.

4 2 4 1 5 0 8 …

.....

.....

.....

Check digit .....

[2]

(ii) An operator has just keyed in the following code number:

3 2 4 0 0 4 5 X

Has the operator correctly keyed in the code number?

.....

Give a reason for your answer.

.....

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.....

.....

[3]

(b) When data are transmitted from one device to another, a parity check is often carried out on each byte of data. The parity bit is often the leftmost bit in the byte.

(i) If a system uses even parity, give the parity bit for each of the following bytes:

parity bit

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

parity bit

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

[2]

(ii) A parity check can often detect corruption of a byte.

Describe a situation in which it **cannot** detect corruption of a byte.

.....

.....

.....[1]

8 The steps to print a document using a laser printer are shown in the table below.

Put each step in the correct order. The first step has been done for you.

Step	Order
As the printing drum rotates, a laser scans across it; this removes the positive charge in certain areas	
The printing drum is coated in positively-charged toner; this then sticks to the negatively-charged parts of the printing drum	
The paper goes through a fuser which melts the toner so it fixes permanently to the paper	
The printer driver ensures that the data is in a format that the laser printer can understand	**1**
A negatively-charged sheet of paper is then rolled over the printing drum	
Data is then sent to the laser printer and stored temporarily in the printer buffer	
The toner on the printing drum is now transferred to the paper to reproduce the required text and images	
The printing drum is given a positive charge	
Negatively-charged areas are then produced on the printing drum; these match exactly with the text and images to be printed	

[8]

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[Turn over

9 A remote-controlled model car contains RAM, ROM and a solid state drive. The car receives radio signals from its remote control. It can only receive radio signals of a certain frequency. The manufacturer sets this frequency and the owner cannot change it. The owner of the model car can input their own sequence of movements from an interface underneath the car.

(a) Describe the purpose of each of the three types of memory supplied with the car.

RAM .....

.....

ROM .....

.....

Solid state drive .....

.....

[3]

(b) The owner needs to be able to enter their own sequence of movements for the model car.

Name a suitable input device.

Input device .....

.....

Give a reason for your choice of device.

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[2]

(c) Explain why the model car uses a solid state drive rather than another type of secondary storage.

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[2]

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