www.PapaCambridge.com

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

8580267993

COMPUTER STUDIES **0420/12**

Paper 1 **October/November 2013**

2 hours 30 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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 a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, 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.

For Examiner's Use

This document consists of **20** printed pages.

© UCLES 2013

www.PapaCambridge.com

For
iner's

1 Internet security is a major issue for many people. The following is a list of five security issues:

- hacking
- pharming
- phishing
- spyware
- viruses

Choose **three** of these security issues.
For **each** one, describe the security issue and suggest a way of protecting against it.

Security issue 1 .....

Description of issue .....

.....

.....

Method of protection .....

.....

.....

Security issue 2 .....

Description of issue .....

.....

.....

Method of protection .....

.....

.....

Security issue 3 .....

Description of issue .....

.....

.....

Method of protection .....

.....

..... [6]

© UCLES 2013

www.PapaCambridge.com

For
iner's

2 **(a)** Mobile phones are communication devices. They allow communication via spe
text messaging.

(i) Most mobile phones offer ***predictive texting***.

State what is meant by this term.

.....

..... [1]

(ii) What **two** additional functions would you expect to find on a mobile phone?

1 .....

.....

2 .....

..... [2]

(b) Connecting a USB telephone to a computer allows communication using VoIP technology.

(i) Give **one** advantage of using VoIP rather than other telephone systems.

.....

.....

(ii) Give **one** disadvantage of using VoIP rather than other telephone systems.

.....

.....

(iii) To use VoIP, there is no need to use a USB telephone.

What other hardware could be used to allow verbal communications?

.....

.....

..... [3]

© UCLES 2013

www.PapaCambridge.com

For
iner's

3 A motor car manufacturer offers various combinations of

- seat colours
- seat materials
- car paint colours

A database was set up to help customers choose which seat and paint combinations were possible.

	seat material			**car paint colours**						
code	**cloth**	**leather**	**seat colour**	***white***	***red***	***black***	***blue***	***green***	***silver***	***grey***
CB	Y	N	black	Y	Y	Y	Y	Y	Y	Y
LB	N	Y	black	N	Y	N	N	N	Y	Y
CC	Y	N	cream	N	Y	Y	Y	N	N	N
LC	N	Y	cream	N	Y	Y	Y	N	N	Y
CG	Y	N	grey	N	Y	Y	Y	Y	Y	N
LG	N	Y	grey	N	Y	N	Y	N	Y	Y
CR	Y	N	red	Y	N	Y	N	N	Y	Y
LR	N	Y	red	Y	N	Y	N	N	Y	Y
CL	Y	N	lime	N	N	N	Y	N	N	N
LL	N	Y	lime	N	N	Y	Y	Y	N	N

(NOTE: N = no, not a possible combination, Y = yes, combination is possible)

(a) How many records are shown in the database?

.....

[1]

(b) The following search condition was entered:

(**cloth** = "Y") AND (**blue** = "Y")

Using **code** only, which records will be found?

.....

.....

.....

[2]

(c) A customer wanted to know the possible combinations for a car with leather seats and either silver or grey paint colour.

What search condition would need to be input?

.....

.....

.....

[2]

© UCLES 2013

www.PapaCambridge.com

(d) A customer decided to buy a green car. He wanted to know which seat colou... seat materials were **not** a possible combination with green paint.

For ...iner's

What search condition would he need to enter?

.....

..... [1]

(e) Give **one** advantage of using the codes Y and N in the database rather than using Yes and No.

.....

..... [1]

4 **(a)** **Seven** hardware items are shown on the right hand side in the diagram below. **Three** applications are shown on the left in the diagram.

By drawing arrows, link **each** application to the appropriate hardware items (each hardware item must be used once only):

	speakers
computer aided design (CAD)	light pen
	microphone
video conferencing	spaceball
	data goggles
virtual reality	webcam
	data gloves

[3]

(b) Name **one** additional item of hardware used in **each** of the **three** applications named in the above diagram.

CAD .....

video conferencing .....

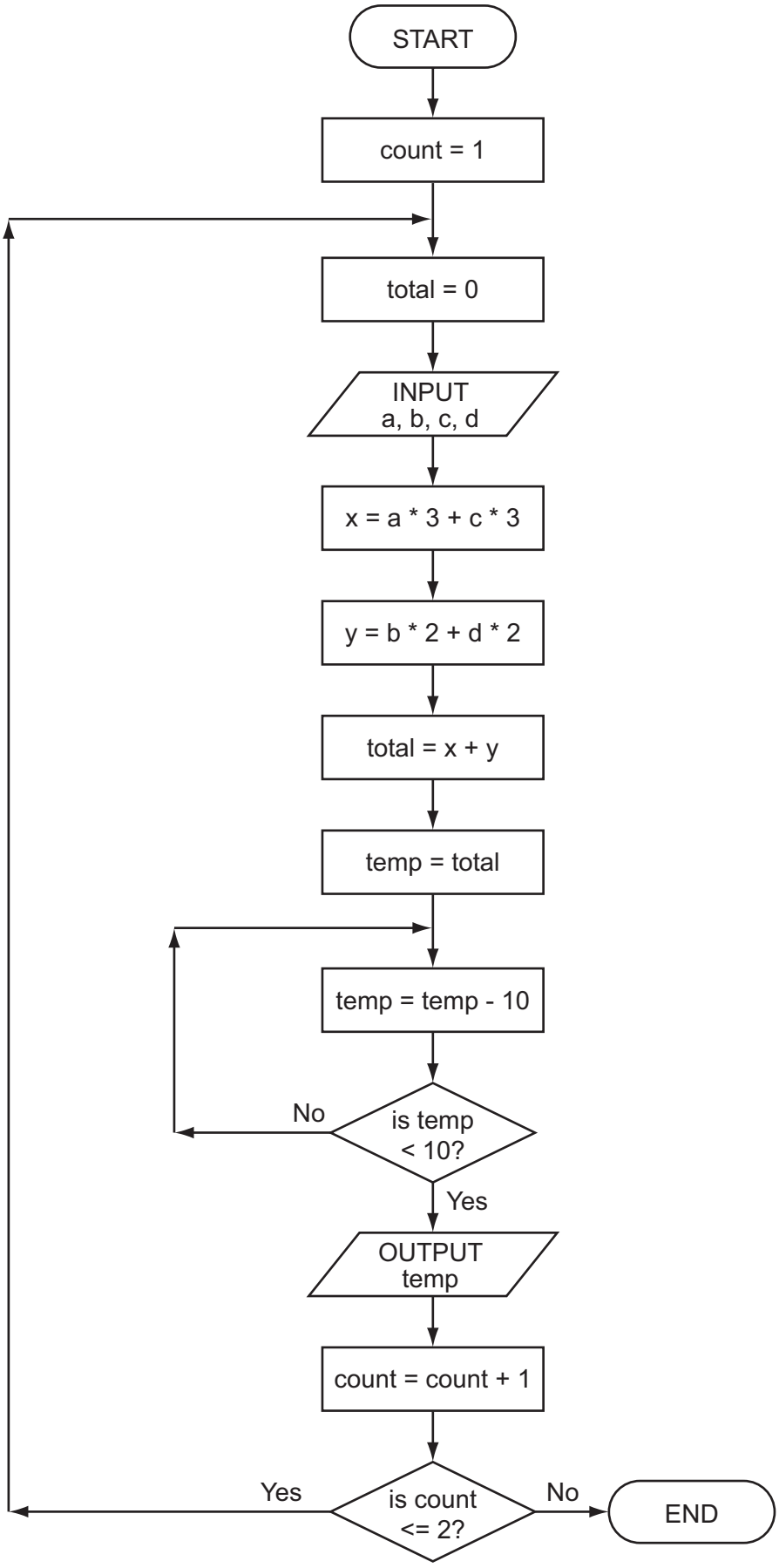
virtual reality ..... [3]

© UCLES 2013

www.PapaCambridge.com

For
iner's

5 Study the following flowchart very carefully.



© UCLES 2013

www.PapaCambridge.com

For
iner's

Complete the trace table for the following two sets of data:

(i) a = 5, b = 4, c = 1, d = 9

(ii) a = 5, b = 9, c = 4, d = 1

count	total	a	b	c	d	x	y	temp	OUTPUT

[6]

© UCLES 2013

www.PapaCambridge.com

For
iner's

6 A spreadsheet was set up to calculate values of ***v*** based on the formula:

v = u + a * t

	A	B	C	D
1	value of ***u***	value of ***a***	value of ***t***	result ***v***
2	20	9.81	10	
3	10	9.81	20	
4	30	9.81	40	
5	40	9.81	30	
6	50	9.81	20	
7	20	9.81	50	
8				

(a) A student typed in **= (D2 + B2 * C2)** into cell D2.

Why would this formula produce an error message?

.....

.....

..... [1]

(b) What is the correct formula that should be in cell D2?

= ..... [1]

(c) If this formula was replicated down to cell D7, what formula would be in D7?

= ..... [1]

(d) What formula is required in cell D8 to find the **highest** value of ***v***?

= ..... [1]

(e) Column B has the same value throughout.

If column B was removed, what would be the new formula in D2?

= ..... [1]

© UCLES 2013

www.PapaCambridge.com

For
iner's

7 A company employs staff who frequently use computer systems.

(a) The health and safety of the staff when using computers is very important.

(i) It was discovered that two staff were suffering from RSI in the hands and wrists.

What could cause such problems?

.....

.....

How could this health risk be removed or reduced?

.....

..... [2]

(ii) Three accidents had been caused by staff tripping over wires in the office.

How could this safety risk be removed?

.....

..... [1]

(iii) Name another health and safety risk and describe what problem it might cause.

Name of risk .....

.....

Description of problem .....

.....

..... [2]

(b) Before the introduction of computers, the staff used to do all the office tasks (such as filing) manually.

Describe **two** ways the introduction of computers might have affected the staff.

1 .....

.....

.....

2 .....

.....

..... [2]

© UCLES 2013

www.PapaCambridge.com

8 A piece of pseudocode was written to input 1000 positive numbers and then outp... highest and lowest numbers.

```
10  highest = 0
20  lowest = 0
30  for count = 1 to 100
40      input number
50      if number > highest then number = highest
60      if number < lowest then number = lowest
70      count = count + 1
80  next count
90  print highest, lowest
```

There are errors in the code.

Locate these errors and suggest a correction.

Error 1 .....

.....

.....

Correction .....

.....

.....

Error 2 .....

.....

.....

Correction .....

.....

.....

Error 3 .....

.....

.....

Correction .....

.....

.....

© UCLES 2013

www.PapaCambridge.com

For
iner's

Error 4 .....

.....

.....

Correction .....

.....

..... [8]

9 Alex sends an email with a number of attachments to his friend, Nicola.

Describe **three** possible problems Nicola might have when she tries to open these attachments.

1 .....

.....

.....

2 .....

.....

.....

3 .....

.....

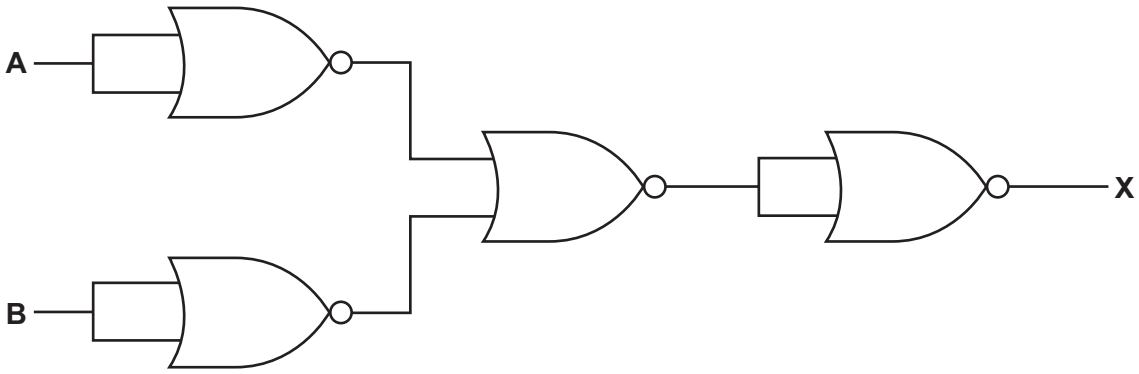
..... [3]

© UCLES 2013

www.PapaCambridge.com

For
iner's

10 (a) (i) Complete the truth table for the following logic circuit which is made up o
gates only.



A	B	Working space	X
0	0		
0	1		
1	0		
1	1		

[2]

(ii) What single logic gate has the same function as the above circuit?

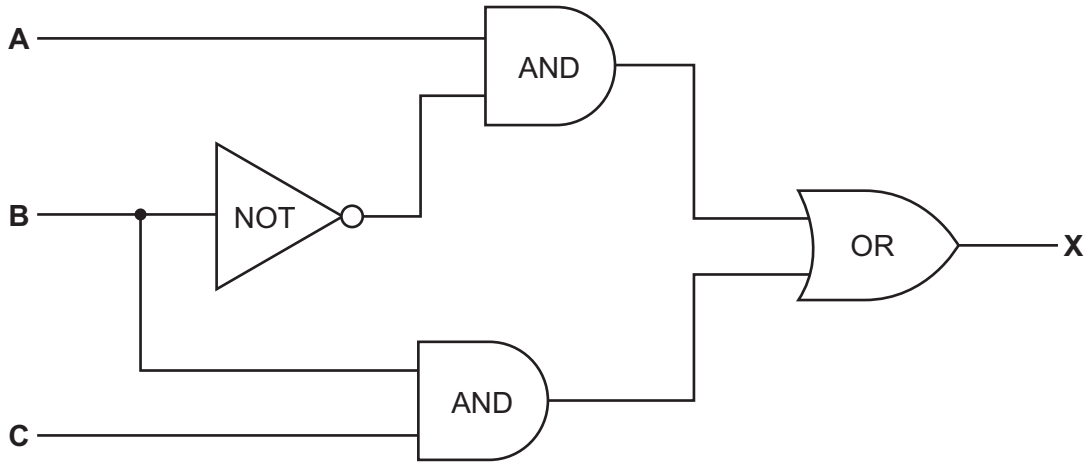
.....

..... [1]

© UCLES 2013

www.PapaCambridge.com

(b) Complete the truth table for the following logic circuit.



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]

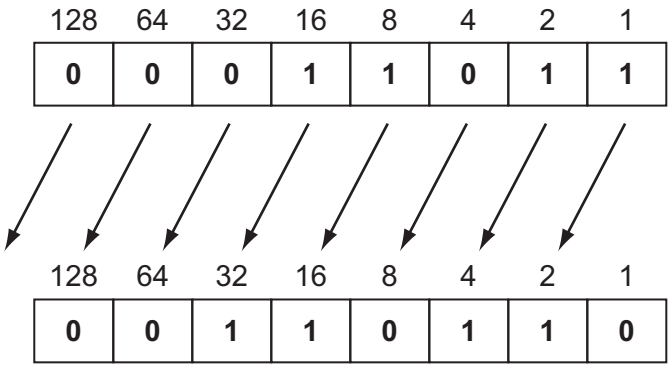
© UCLES 2013

www.PapaCambridge.com

For
iner's

11 A denary number can be represented as an 8-bit binary number. For example:

27 would be represented as:



All the bits in the binary number have now been shifted (moved) one place to the left.

(a) What denary number does this now represent?

.....

[1]

(b) What effect did the shift have on the original denary number?

.....

.....

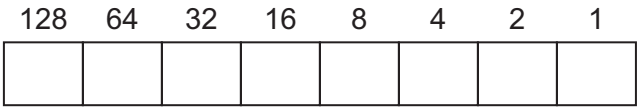
[1]

(c) If the above binary number was shifted another one place to the left, what denary number would it be equivalent to?

.....

[1]

(d) **(i)** Represent the denary number 46 as an 8-bit binary number.



[1]

(ii) Shift this 8-bit binary number 2 places to the left.
What is the denary equivalent?

.....

[1]

(iii) What problem would arise if you tried to shift this 8-bit binary number 3 places to the left?

.....

.....

[1]

© UCLES 2013

www.PapaCambridge.com

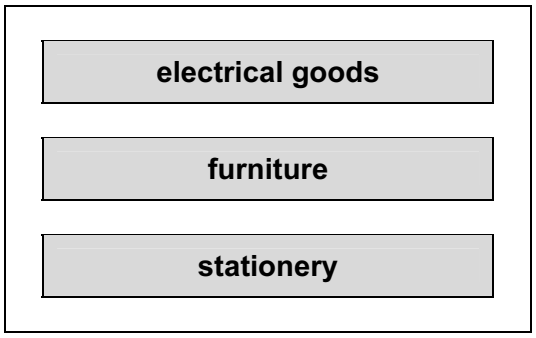
(e) If any 8-bit binary number was shifted one place to the **right**, what would t... equivalent to?

.....

..... [1]

12 A shop uses an information screen linked to a computer to allow customers to order goods directly.

The first screen shows three options:



(a) What is the best input device to allow customers to choose one of the three options?

..... [1]

(b) The customer is then sent to another screen where they have to input:

- the goods reference number which is 8 digits long
- today's date which must be in the form dd/mm/yyyy
- the customer's telephone number

For each input give **one** validation check that should be performed.
A **different** type of check must be given in each case.

goods reference number .....

today's date .....

telephone number ..... [3]

© UCLES 2013

www.PapaCambridge.com

For
iner's

13 A company advertises its Internet broadband speeds as follows:

- download speed of 128 megabits per second
- upload speed of 16 megabits per second (8 bits = 1 byte)

(a) Explain what is meant by the two terms *download speed* and *upload speed*.

download speed .....

.....

.....

upload speed .....

.....

..... [2]

(b) Give **two** advantages of using broadband rather than dial-up.

1 .....

.....

2 .....

..... [2]

(c) Give **two** different scenarios when a fast broadband connection is essential.

1 .....

.....

2 .....

..... [2]

(d) How many 4-megabyte files could be *downloaded* per second using this company's broadband?

.....

.....

..... [1]

© UCLES 2013

www.PapaCambridge.com

14 An expert system has been developed to help diagnose faults in car engines. The s… has been installed on a laptop computer.

For …iner's

(a) Describe **two** desirable features to look for in a laptop rather than a desktop computer.

1 .....

.....

2 .....

..... [2]

(b) Part of the expert system is supplied on a memory stick. This needs to be plugged into a USB port for the expert system to work.

Give **one** reason why this is done.

.....

.....

..... [1]

(c) Describe **two** features you would expect to see in the expert system's interactive user interface.

1 .....

.....

2 .....

..... [2]

(d) Apart from the user interface, name **three** other components that make up a typical expert system.

1 .....

.....

2 .....

.....

3 .....

..... [3]

© UCLES 2013

www.PapaCambridge.com

For
iner's

15 A library uses barcodes to identify borrowers and books. A borrower has a card co… a barcode with an equivalent numerical code. Each book also has a barcode wit… equivalent numerical code.

The flowchart on the facing page shows what happens when book(s) are taken out by a borrower. However, several stages are missing.

Using **item numbers only**, complete the flowchart by selecting stages from the item list below.

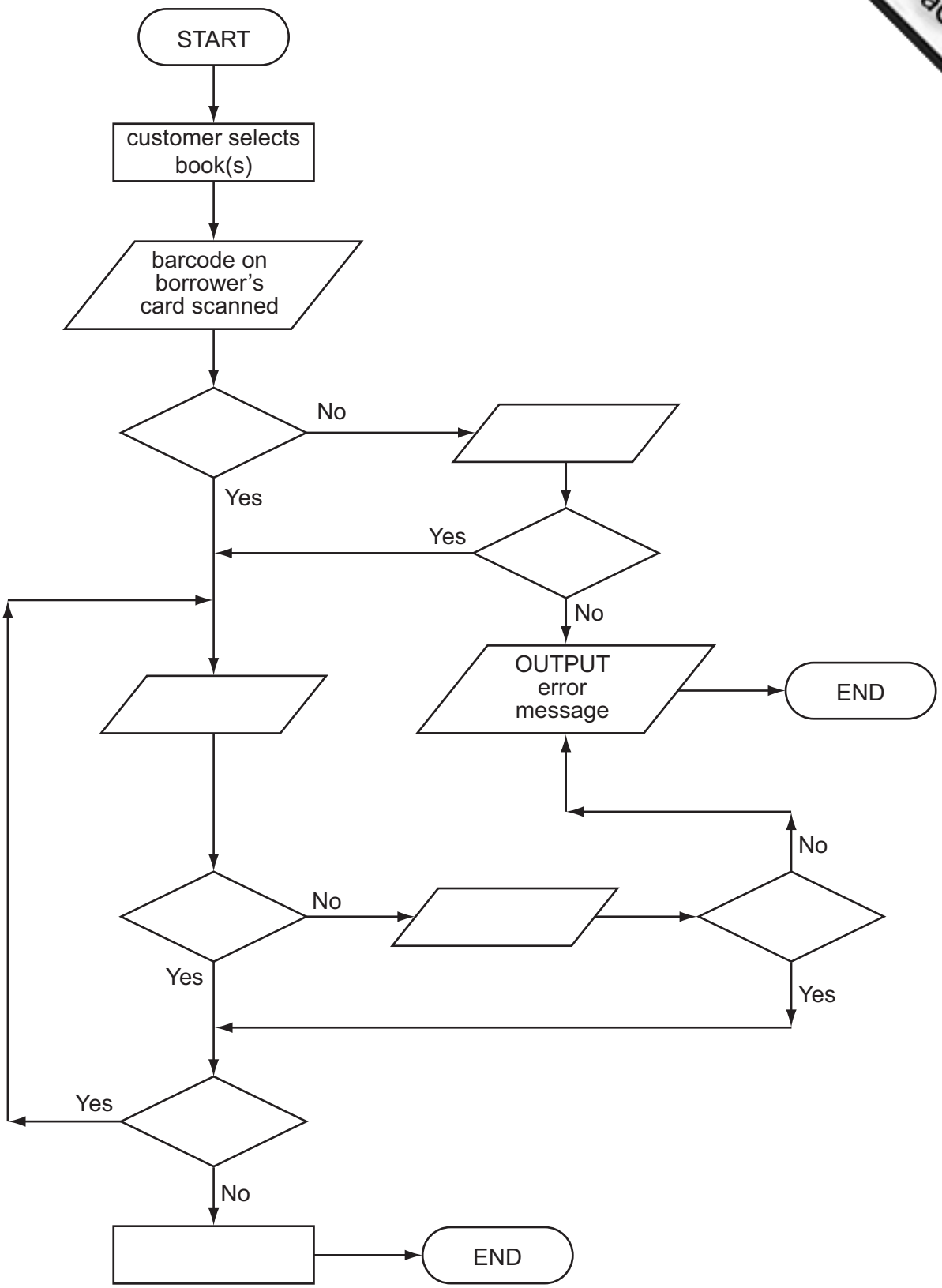
Item List

Item Number	Item Description
1	any more books to scan?
2	has book's barcode been recognised?
3	has book's numeric code been recognised?
4	has borrower's barcode been recognised?
5	has borrower's numeric code been recognised?
6	input book's numeric code manually
7	input borrower's numeric code manually
8	scan in barcode shown in book
9	update borrower and book files

© UCLES 2013

www.PapaCambridge.com

For
iner's



[6]

© UCLES 2013

www.PapaCambridge.com

For
iner's

16 (a) A greenhouse is being monitored by a computer using 2 sensors. SENSOR1 me
the temperature and SENSOR2 measures oxygen levels.

If the temperature exceeds 45°C or oxygen levels fall below 0.19, then an error message is output by the computer.

Write an algorithm, using pseudocode or flowchart only, which

- inputs both sensor readings
- checks the sensor input values and outputs a warning message if either are out of range
- continues monitoring until the <ESCAPE> key is pressed

(You may assume that READ SENSOR*n* will take a reading from SENSOR*n* and that READ KEY inputs a key press from the keyboard).

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

(b) Describe why a DAC (digital to analogue converter) would be needed if the computer is used to **control** the greenhouse environment.

.....

.....

.....

..... [2]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

© UCLES 2013