



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

CANDIDATE  
NAME

CENTRE  
NUMBER

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**COMPUTER STUDIES**

**0420/13**

Paper 1

**May/June 2014**

**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 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.

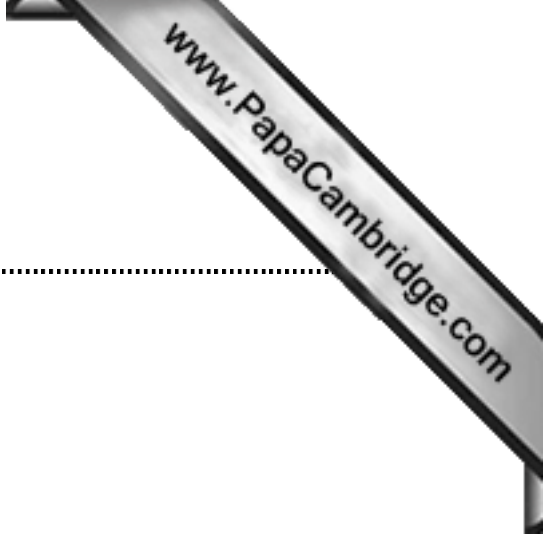
No marks will be awarded for using brand names of software packages or hardware.

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 100.

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



1 (a) Name and draw **two** types of network topology.

Name 1 .....

Drawing 1

Name 2 .....

Drawing 2

[4]

(b) Give **two** benefits of having computers networked together.

1 .....

.....

2 .....

..... [2]

(c) Give **one** drawback of having computers networked together.

.....

..... [1]



2 (a) (i) A student wrote: *“batch processing can be used when making airline bookings”*

Why is this statement incorrect?

.....  
.....  
..... [1]

(ii) The same student also wrote: *“to launch an application, a graphical user interface (GUI) requires typing the name of the application using a keyboard”*.

Why is this statement incorrect?

.....  
.....  
..... [1]

(b) A user interface is a function of a typical operating system.

Write down **four** other functions of a typical operating system.

1 .....  
.....  
2 .....  
.....  
3 .....  
.....  
4 .....  
..... [4]

3 A hospital holds records of its patients in a database. Four of the fields are:

- date of visit (dd/mm/yyyy)
- patient's height (m)
- 8-digit patient ID
- contact telephone number

The presence check is one possible type of validation check on the data. For each field, give another validation check that can be performed. Give an example of data which would **fail** your named validation check.

A **different** validation check needs to be given for each field.

field name	name of validation check	example of data which would fail the validation check
date of visit		
patient's height		
patient ID		
contact telephone number		

[8]

- 4 The diagram below shows a number of descriptions and terms used in computer security. By drawing arrows, connect the correct description to the computer security term.

Program installed on a PC to gather data about the user. It monitors every key press and relays the data back to the home base.	Cookies
Junk (unsolicited) electronic mail advertising products and services sent to a general mailing list.	Phishing
Sending an email that claims to be from a legitimate company; the recipient is then directed to a bogus website where their personal details will be collected.	Pharming
Malicious code installed on a PC or on a server. This code directs users to a fraudulent website without their knowledge.	Spyware
Act of locating and possibly exploiting a wireless network by touring an area. This requires a laptop with relevant software and an antenna.	Spam
Information that a website stores about a user on the user's hard disk; this enables the website to remember details about the user when they next visit the website.	War-driving

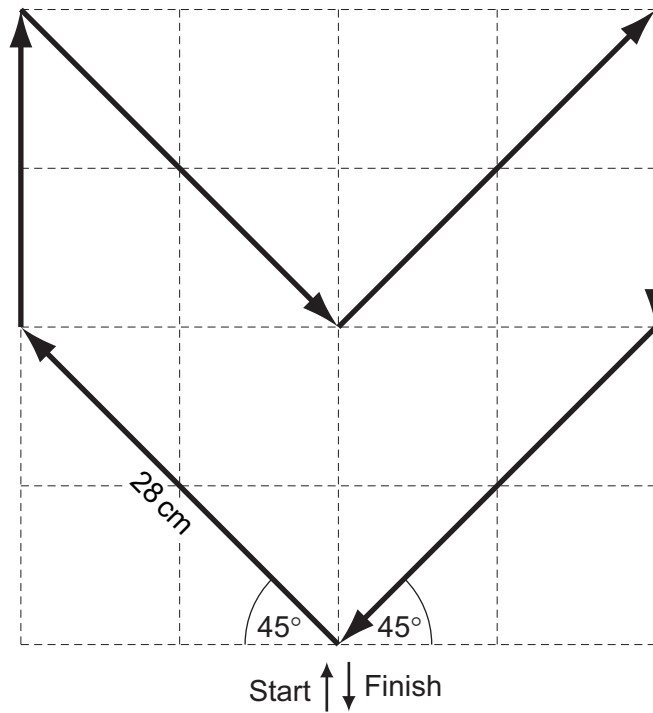
[5]

5 A floor turtle can use the following instructions.

Instruction	Meaning
FORWARD $x$	Move $x$ cm forwards
BACKWARD $x$	Move $x$ cm backwards
LEFT $t$	Turn left $t$ degrees
RIGHT $t$	Turn right $t$ degrees
REPEAT $n$	Repeat next set of instructions $n$ times
ENDREPEAT	Finish repeated instructions
PENUP	Lift the pen
PENDOWN	Lower the pen

Each square is  
10 cm by 10 cm

Each diagonal  
line is 28 cm long





Complete the following set of instructions to draw the shape in the direction shown by

- |         |    |       |
|---------|----|-------|
| PENDOWN | 7  | ..... |
| LEFT 45 | 8  | ..... |
| 1       | 9  | ..... |
| 2       | 10 | ..... |
| 3       | 11 | ..... |
| 4       | 12 | ..... |
| 5       | 13 | ..... |
| 6       | 14 | ..... |

[5]



6 A company has eight warehouses throughout Europe. It has decided to introduce online shopping and has launched a website.

Customers can now buy online instead of physically going to the warehouse.

(a) Give **two** benefits to the customer.

1 .....

2 .....

..... [2]

(b) Give **two** benefits to the company.

1 .....

2 .....

..... [2]

(c) Give **three** potential effects on the staff who presently work for the company.

1 .....

2 .....

3 .....

..... [3]

(d) Give **two** features you would expect to see on the company's website.

1 .....

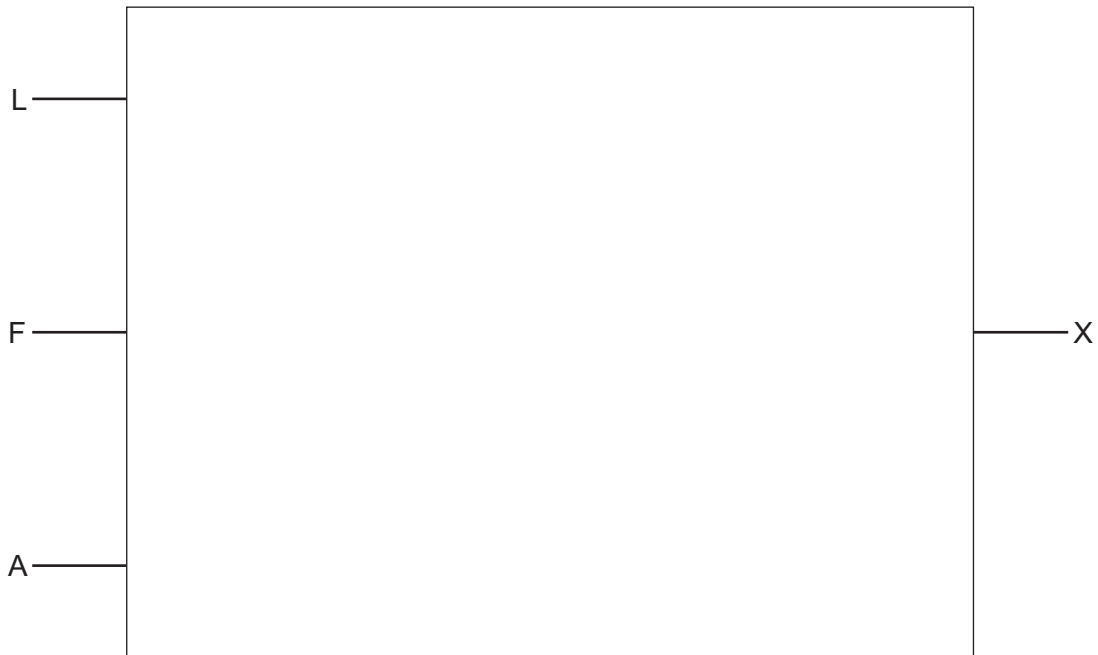
2 .....

..... [2]



7 (a) Draw the logic circuit for the logic statement:

$X = 1$  if (L is NOT 1 AND F = 1) OR (F is NOT 1 AND A is 1)



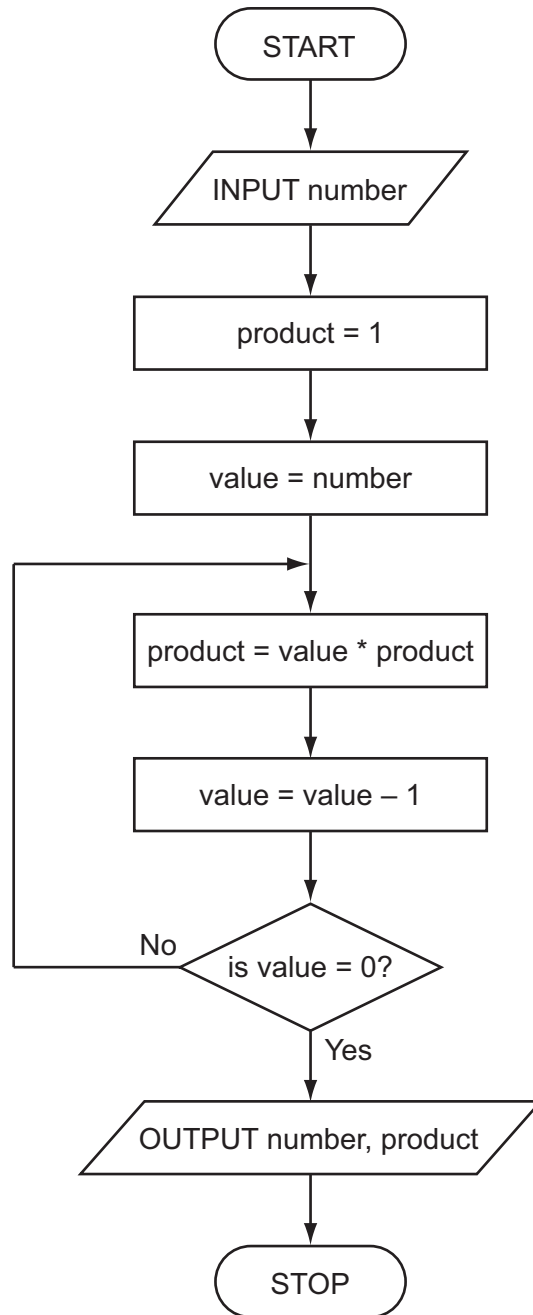
[5]

(b) Complete the truth table for the above system.

L	F	A	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]

8 Study the following flowchart very carefully.



Complete the trace table for the **input value of 5**:

number	product	value	OUTPUT

[4]

- 9 A spreadsheet has been set up to monitor six experiments.

	A	B	C	D	E	F	G
1	Experiment number	Start volume (litres)	End volume (litres)	Volume change (litres)	Start pressure (bar)	End pressure (bar)	Pressure change (bar)
2	1	21	33	12	1.0	2.2	1.2
3	2	19	40	21	1.0	3.3	2.3
4	3	20	37	17	1.0	3.0	2.0
5	4	18	48	30	1.0	3.6	2.6
6	5	20	44	24	1.0	3.4	2.4
7	6	19	33	14	1.0	2.6	1.6
8							

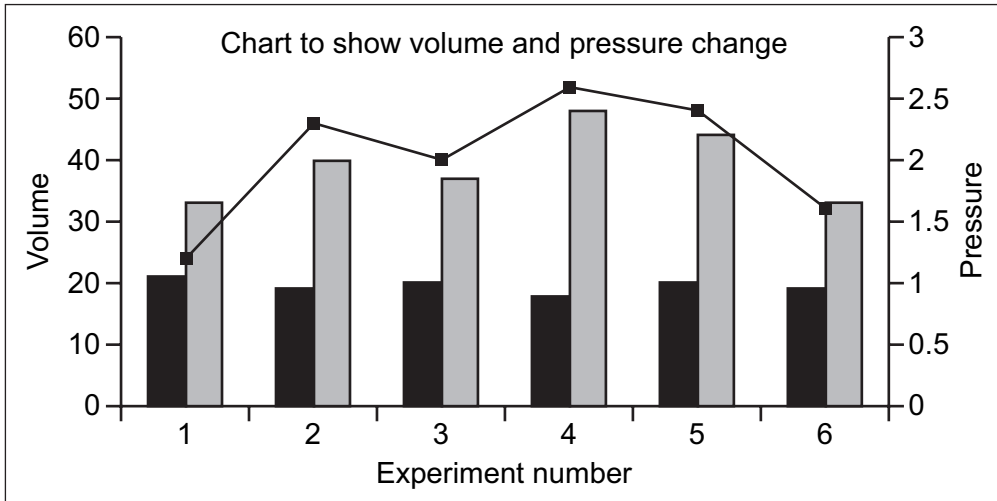
- (a) What formulas must be in column D and column G?

	D	G
1	Volume change (litres)	Pressure change (bar)
2	=	=
3	=	=
4	=	=
5	=	=
6	=	=
7	=	=

[4]

(b) What cells were highlighted to draw the chart below?

.....  
 .....



[2]

(c) What formula should be in cell D8 to find the average **volume change**?

= ..... [1]

(d) What formula should be in cell G8 to find the highest **pressure change**?

= ..... [1]



10 You have been asked to write a report on the use of the following communication methods.

- mobile phones
- video conferencing
- emails

Describe a benefit and a drawback of each of the above communication methods.

**mobile phones**

Benefit .....

.....

.....

Drawback .....

.....

.....

**video conferencing**

Benefit .....

.....

.....

Drawback .....

.....

.....

**emails**

Benefit .....

.....

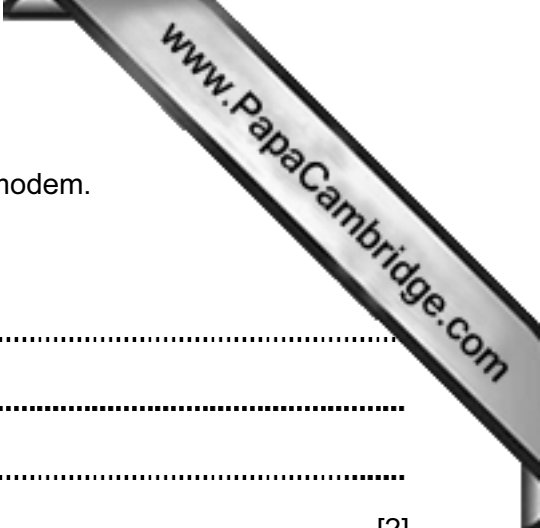
.....

Drawback .....

.....

.....

[6]



11 Dima has decided to change his dial-up modem for a broadband modem.

(a) Give **two** advantages of doing this.

1 .....

.....

2 .....

..... [2]

(b) Dima has agreed to send Michaela a 20 megabyte file. They both have a broadband connection.  
 Dima has to upload his file to a server and then Michaela needs to download it from the same server.

The broadband data transfer rates (speeds) are:

- 1 megabits per second to upload a file
- 8 megabits per second to download a file

(Note: 8 bits = 1 byte)

(i) How long does it take to upload Dima's file?

.....

.....

.....

..... [2]

(ii) How long does it take to download Dima's file?

.....

.....

..... [1]

(c) Dima has decided to use wireless LAN (WiFi) connections.

Give **one** advantage and **one** disadvantage of doing this.

Advantage .....

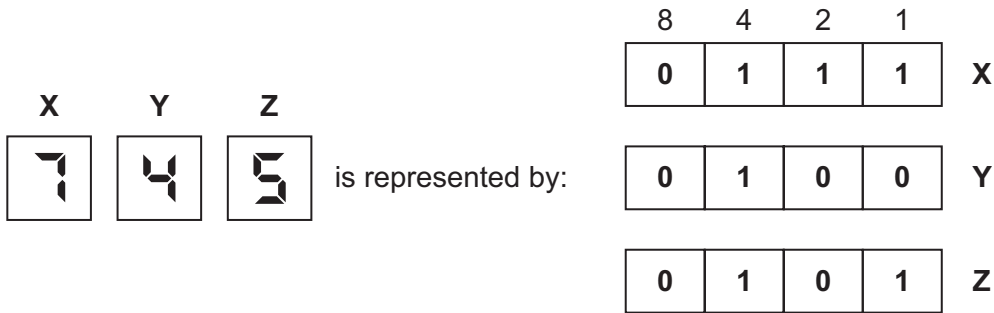
.....

Disadvantage .....

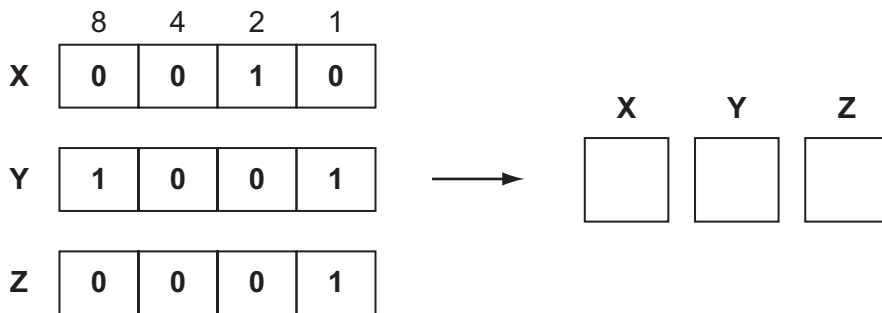
..... [2]

12 A digital light meter has a 3-digit LCD. The value of each digit on the instrument display is stored as a 4-bit binary number in a register.

For example:

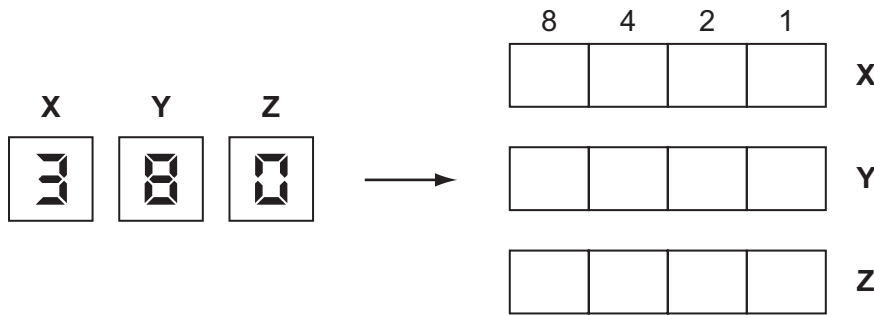


(a) What value is shown on the display if the 4-bit binary registers contain:



[3]

(b) What would be stored in the 4-bit binary registers if the display shows:



[3]

(c) If any of the 4-bit binary registers X, Y or Z contain the value 1 1 1 1 this indicates an error.

(i) How could this error be shown on the instrument display?

..... [1]

(ii) What could cause an error to occur?

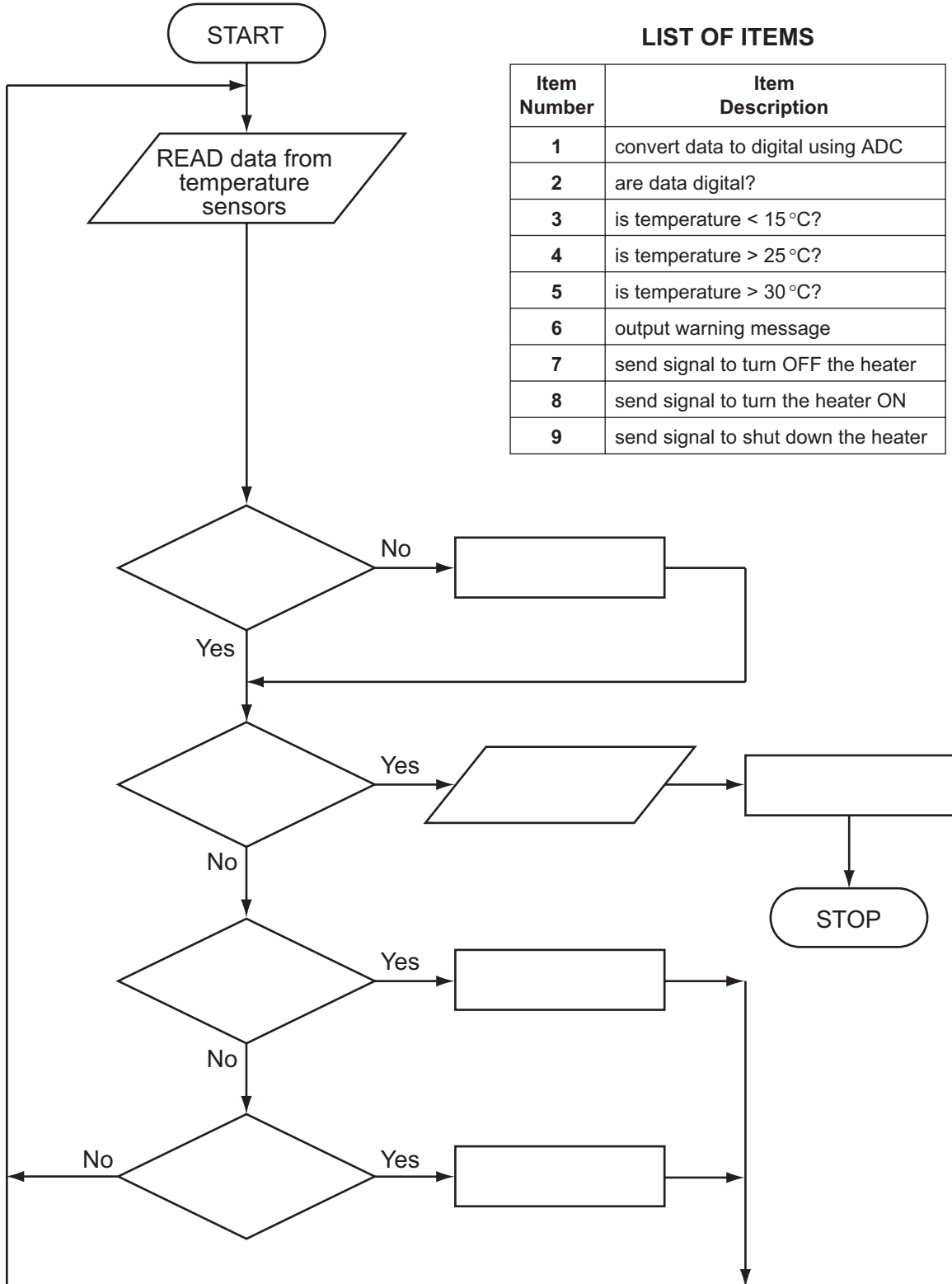
..... [1]



13 A heating system is being controlled by sensors and a computer. The temperature is kept between 15°C and 25°C. If 30°C is exceeded a warning message is generated and the heater shuts down.

A flowchart of the process is shown below. Some of the items are missing.

Complete the flowchart, **using item number only**, from the list of items given.



[4]



14 A database was set up showing statistics for some states in the USA. Part of the data is shown below.

Ref	Name of state	Population (millions)	Number of houses (millions)	Area (sq miles)	Density	Travel time to work (min)
OR	Oregon	3.8	1.6	96 000	39.6	22.3
CO	Colorado	4.9	2.1	104 000	47.1	24.3
NJ	New Jersey	8.7	3.5	7 400	1175.7	30.0
TX	Texas	24.3	9.4	262 000	92.7	25.4
CA	California	36.8	13.3	156 000	235.9	27.7
FL	Florida	18.3	8.7	53 900	339.5	26.2
AK	Alaska	0.7	0.3	572 000	1.2	19.6
NV	Nevada	2.6	1.1	110 000	23.6	23.3
NY	New York	19.5	7.9	47 000	414.9	31.7

(a) (i) How many records are in this section of the database?

..... [1]

(ii) How many fields are in each record?

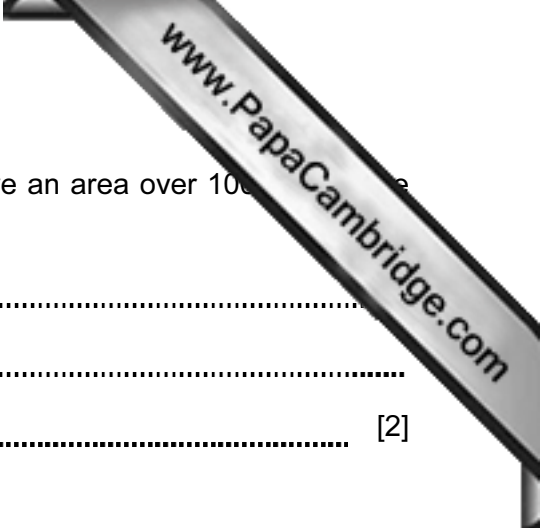
..... [1]

(b) The following search condition was entered:

**(Population (millions) < 4.0) OR (Number of houses (millions) < 4.0)**

Using **Ref** only, write down which records will be found.

.....  
 ..... [2]



(c) Write down the search condition to find out which states have an area over 100,000 square miles and where it takes less than 25 minutes to get to work.

.....

.....

..... [2]

(d) (i) What should be the key field in this database?

..... [1]

(ii) Give a reason for your choice.

.....

..... [1]

