Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

3178912092

COMPUTER STUDIES **7010/12**

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.

1 Four health and safety risks are shown in the table below.

Put a tick (✓) in either column 2 or 3 to indicate whether the risk is a health risk or a safety risk.

In column 4, describe a method of removing or reducing the risk. Give a different method for each risk.

1	2	3	4
risk	**health risk**	**safety risk**	**method of removing or reducing the risk**
eye strain			
trip hazard			
fire			
Repetitive Strain Injury (RSI) in the wrists			

[6]

2 A customer books a flight to Brazil using an online travel agency.

(a) Describe the steps taken by the customer and by the agency when booking the flight online.

.....

.....

.....

.....

.....

.....

.....

..... [3]

(b) Describe the main differences between **batch processing** and **real time transaction processing**.

.....

.....

.....

..... [2]

3 **(a)** Name **two** items of software needed to run video conferencing. In **each** case, explain the purpose of the software.

software item 1 .....

.....

purpose .....

.....

.....

software item 2 .....

.....

purpose .....

.....

..... [4]

(b) The table below has three statements. Each of them is about video conferencing.

One or more of these is a benefit of using video conferencing.

Tick (✓) each statement that is a benefit.

statement	benefit
It is possible to hold meetings at any time.	
There is no problem with time zones.	
Reduces the “hidden cost” of employees being away from the office.	

[1]

(c) A student made the following two statements. Each of them is about video conferencing hardware.

Explain why **both** statements are incorrect.

"microphones are used so that delegates can hear what is being said"

.....

.....

.....

"webcams record the images and then transmit them to the other meeting room"

.....

.....

..... [2]

(d) Describe **two** drawbacks of using video conferencing.

1 .....

.....

.....

2 .....

.....

..... [2]

4 A student used the Internet to help with his Chemistry project. He typed the following into a search engine:

transition + elements

(a) The first two search results listed were:

Chemistry of the **transition elements**

The **elements** of **transition** during computer animation

Considering these two examples, describe **one** problem when using search engines.

.....

..... [1]

(b) This search gave the student over 480 000 results ("hits").

Many of these results were not relevant.

How could the student obtain more relevant results?

.....

..... [1]

(c) Other than security issues, describe **one** undesirable feature of using the Internet when looking for information.

.....

..... [1]

(d) Describe **one** benefit of using the Internet to find information.

.....

..... [1]

5 The following algorithm should:

- input ten numbers
- output the largest number input
- output the average value of the input data

```
10      largest = 0
20      sum = 0
30      for x = 1 to 10
40          input x
50          if x > largest then x = largest
60          output largest
70          sum = sum + x
80      next x
90      average = sum * 10
100     output average
```

There are **four** errors in this algorithm.

Locate these errors and suggest a correction.

error 1 .....

correction .....

.....

error 2 .....

correction .....

.....

error 3 .....

correction .....

.....

error 4 .....

correction .....

..... [4]

6 The following diagram shows six descriptions of automatic data capture methods and six terms.

Draw lines to connect each description to the correct term.

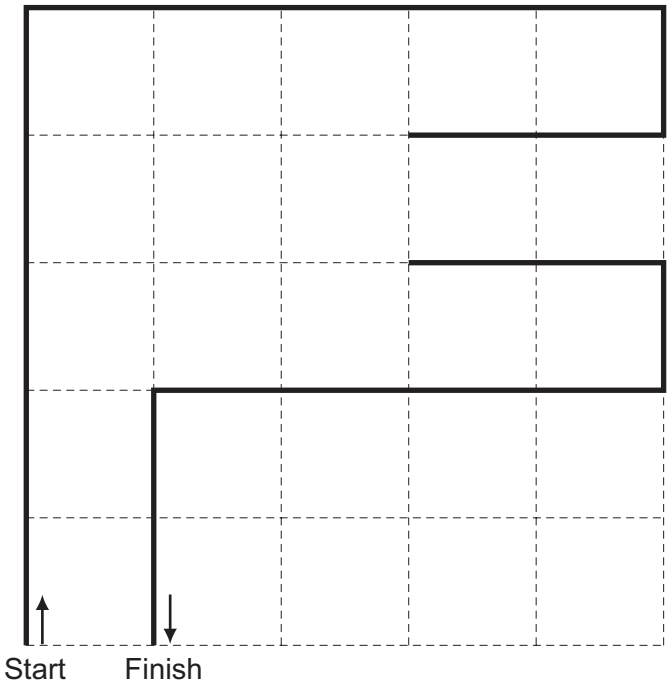
reading data directly from hard copy and converting into electronic/ computer-readable form	biometrics
use of fingerprint scans, retina scans, face identification, etc. as a way of identifying a person uniquely	data logging
recognises spoken word patterns and compares them to patterns stored in memory	optical character recognition (OCR)
use of minute electronic devices (containing microchip and antenna) that can be read from distances up to 5 metres	optical mark recognition (OMR)
automatic data collection using sensors	radio frequency identification (RFID)
system that reads pencil or pen marks on a piece of paper in pre-determined positions	voice recognition

[5]

7 A floor turtle uses the following commands:

command	description
FORWARD ***n***	Move ***n*** cm in a forward direction
BACKWARD ***n***	Move ***n*** cm in a backward (reverse) direction
RIGHT ***t***	Turn right through ***t*** degrees
LEFT ***t***	Turn left through ***t*** degrees
PENUP	Lift the drawing pen up
PENDOWN	Lower the drawing pen
REPEAT ***x***	Repeat the next set of instructions ***x*** times
ENDREPEAT	Finish the REPEAT loop

In the following grid, each of the squares measures 10 cm by 10 cm:



Complete the set of instructions to draw the shape shown above (in bold lines).

1 PENDOWN

2 REPEAT 2

3 .....

4 .....

5 .....

6 .....

7 .....

8 .....

9 .....

10 .....

11 .....

12 .....

13 .....

14 .....

15 .....

16 .....

17 .....

18 .....

19 .....

20 .....

21 .....

22 .....

23 .....

24 .....

25 .....

26 .....

[6]

[Turn over

8 In each case below, state which Internet term is being described.

(a) Malicious software installed on a user's hard drive or a web server; the software re-directs the user to a fake website without their consent or knowledge.

..... [1]

(b) Personal Internet journals where a writer enters text about a certain topic; anyone can comment on the topic.

..... [1]

(c) Websites designed to promote the building of online communities who share the same interests; usually free of charge; users can add friends, post messages to each other and update personal profiles.

..... [1]

(d) Legitimate-looking email sent to a user in the hope of gathering personal information; as soon as the recipient clicks on the link in the email (or email attachment) they are sent to a fake website.

..... [1]

(e) Software that secretly gathers information by monitoring key presses on a user's keyboard; this information is relayed back to the person who sent the software originally.

..... [1]

9 The five statements below are incomplete. Each statement is about **computer animation.**

(i) When producing 3D animation effects, ... are used to define the start point and the end point to allow a smooth transition in the animation.

(ii) The use of intermediate frames between two images to give the appearance of movement is called ..... .

(iii) If one image merges into another different type of image (e.g. a mouse turning into an alien) this is called ..... .

(iv) ..... is used to generate the final 3D image from the 2D model.

(v) Sometimes ..... are used; these are variables controlling the position of part of an animated character.

Complete the **five** statements above using terms from the following list:

- animation
- avars
- cartoons
- key frames
- morphing
- rendering
- stick figures
- tweening
- wikis

(i) .....

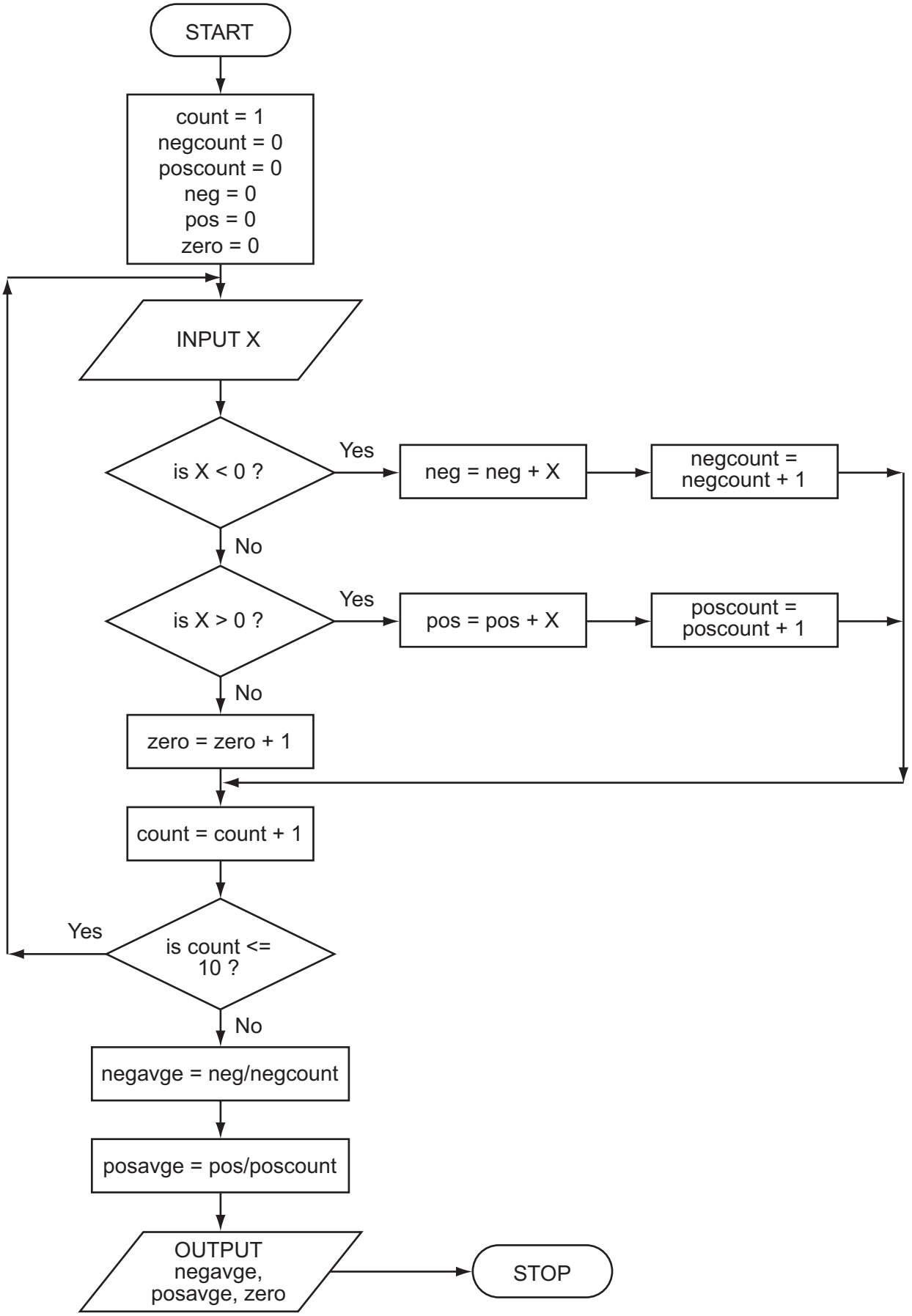
(ii) .....

(iii) .....

(iv) .....

(v) ..... [5]

10 Study the following flowchart.



Complete the trace table for the flowchart using the following data:

0, 3, 5, 6, -4, -1, 0, 0, -4, 10

negcount	poscount	neg	pos	zero	count	X	negavge	posavge

[6]

11 A computer system can be changed over to a new one by direct changeover.

Name **two** other methods of changeover. Give **one** benefit and **one** drawback of each method.

method 1 .....

.....

benefit .....

.....

.....

drawback .....

.....

.....

method 2 .....

.....

benefit .....

.....

.....

drawback .....

.....

..... [6]

12 Camilo works as a hotel inspector. He travels to hotels in his own country and overseas. He visits the hotels and then sends back a report to his head office after each hotel visit.

(a) Name **three** modern electronic devices that Camilo could use to help him with his work. Give a different reason for your choice of **each** device.

device 1 .....

reason .....

.....

.....

device 2 .....

reason .....

.....

.....

device 3 .....

reason .....

.....

..... [6]

(b) Most of the hotels offer wireless Internet (Wi-Fi) in the rooms.

Give **two** disadvantages of using wireless (Wi-Fi) rather than wired Internet access.

1 .....

.....

2 .....

..... [2]

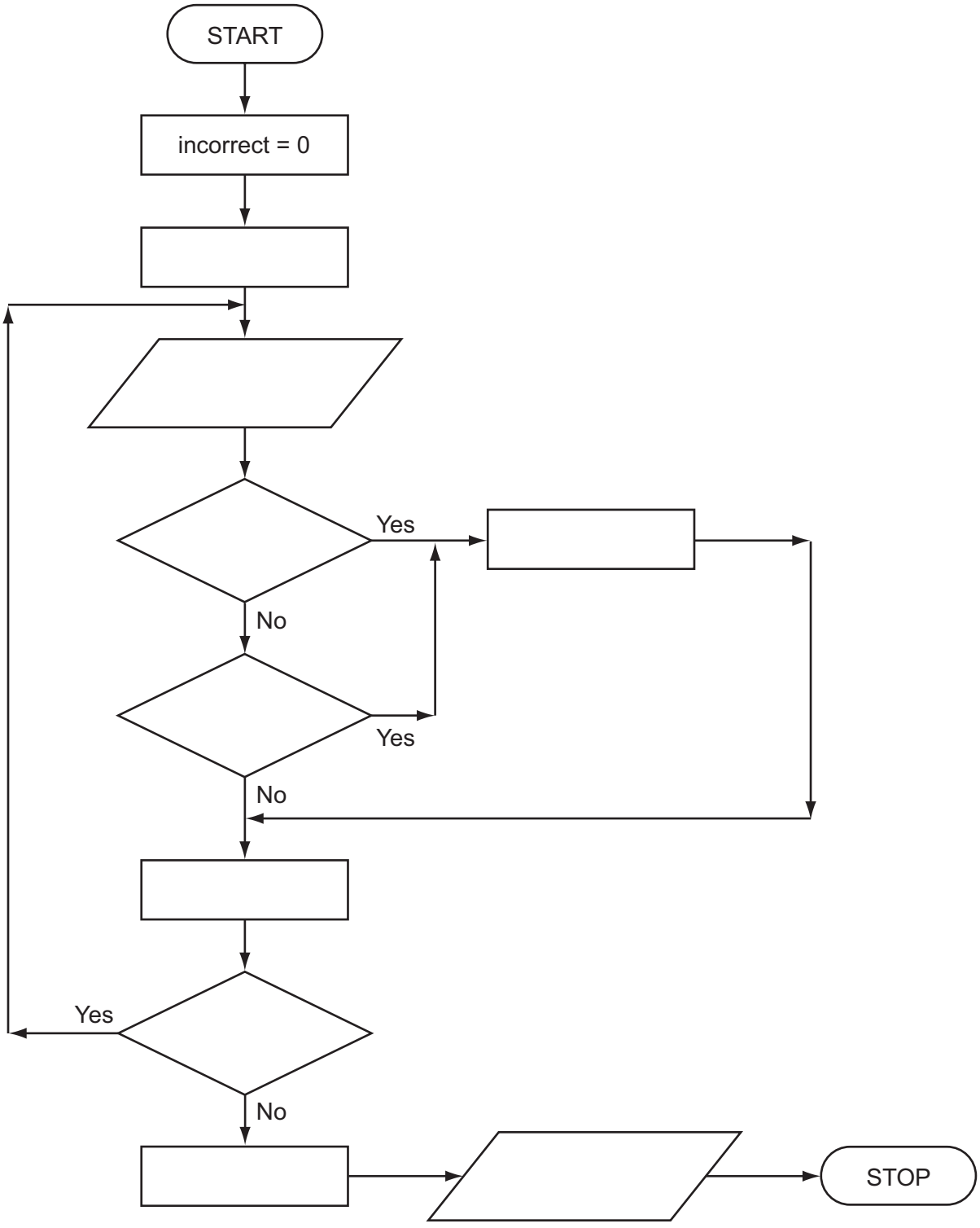
13 An algorithm has been written to check that code numbers are valid on input. They must be in the range 1000 to 9999.

Five hundred codes are being entered and the percentage of entered codes which are incorrect is output.

There is a flowchart on the opposite page. It has some statements missing.

Complete the flowchart. Use statement numbers only, chosen from the list below.

statement number	statement
1	Incorrect = Incorrect + 1
2	INPUT Code
3	is Number <= 500 ?
4	is Code < 1000 ?
5	is Code > 9999 ?
6	Number = 1
7	Number = Number + 1
8	OUTPUT Percent
9	Percent = Incorrect / 5



[4]

14 A spreadsheet has been written to help students with their Chemistry. Chemical elements are written as:

$$\text{mass number}\ X\ \text{atomic number}$$

For example, iron is represented as:

$$^{56}_{26}\text{Fe}$$

An atom of a chemical element is made up of protons, neutrons and electrons.

atomic number = number of protons = number of electrons

mass number = atomic number + number of neutrons

The spreadsheet is shown below. Column B contains input values and column C contains calculation results. Input values for the element iron are shown as an example.

Show what formulas must be in cells C3, C4 and C5:

	A	B	C
1	input mass number	56	
2	input atomic number	26	
3	number of electrons		=
4	number of protons		=
5	number of neutrons		=

[3]

15 (a) State **four** components of an expert system.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

..... [4]

(b) Give an example of the use of an expert system.

.....

..... [1]

16 An encryption system gives each letter of the alphabet a value:

A = 1, B = 2, C = 3, …… , Y = 25, Z = 26.

Each letter is stored in a 12-bit binary register. The letter "**S**" (19th letter) is stored as:

2048	1024	512	256	128	64	32	16	8	4	2	1
0	0	0	0	0	0	0	**1**	**0**	**0**	**1**	**1**

A 4-bit register is used to store the encryption key. This register shows how many places the bits are shifted to the left in the 12-bit register when it is encrypted. So,

8	4	2	1
0	**1**	**0**	**1**

means each bit in the 12-bit register is shifted 5 places to the left and the register now becomes:

2048	1024	512	256	128	64	32	16	8	4	2	1
0	0	**1**	**0**	**0**	**1**	**1**	0	0	0	0	0

Therefore, the letter **"S"** would be transmitted with the 4-bit register and the 12-bit register as follows:

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

(a) **"W"** is the 23rd letter of the alphabet.

(i) Show how this letter would be stored in the 12-bit register before encryption:

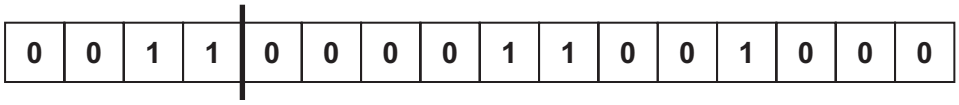
(ii) The 4-bit register contains the following value:

8	4	2	1
0	**1**	**1**	**0**

Show how the letter **"W"** is now stored in the 12-bit register in encrypted form:

[2]

(b) Find which letter of the alphabet has been encrypted here. (Show all your working.)



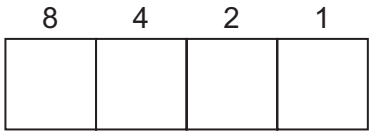
.....

.....

.....

..... [2]

(c) **(i)** What is the largest encryption key that can be stored in the 4-bit register?



(ii) Convert this into denary (base 10).

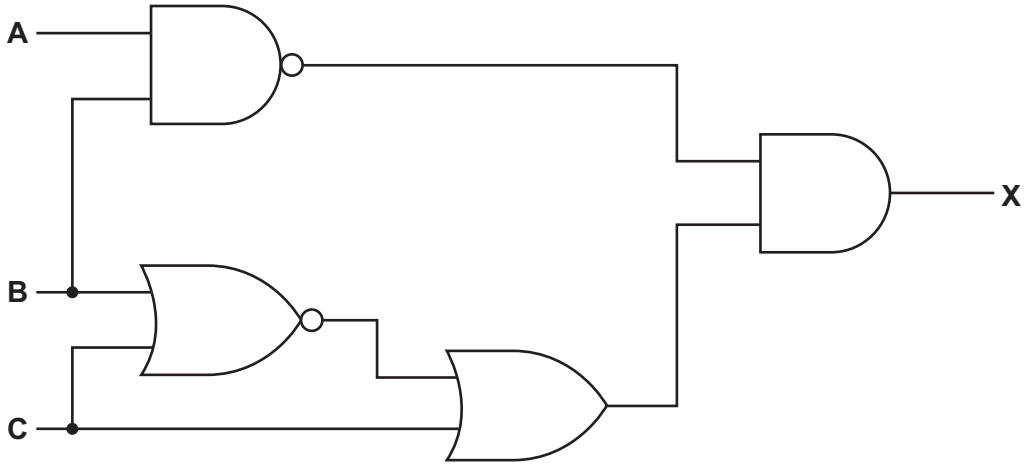
.....

(iii) If this encryption key were used, what problem would it cause?

.....

..... [3]

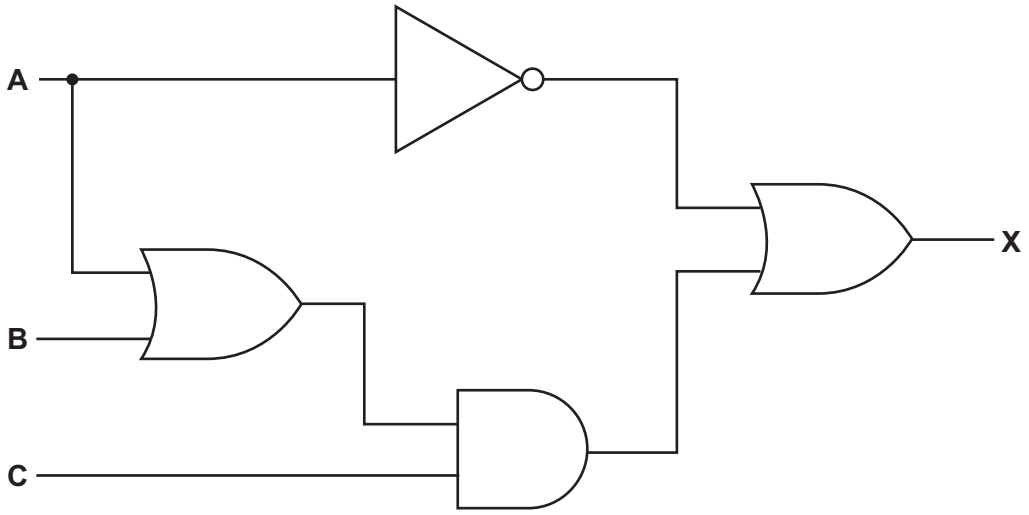
17 (a) Complete the truth table for the following logic circuit:



A	B	C	Working	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]

(b) Write the logic statement to describe the following logic circuit:



.....

.....

.....

..... [3]

18 A school has 1500 students. It is conducting a survey on their music preferences. Each student uses a computer and inputs their name and then chooses one of 5 options:

- rock (input value 1)
- soul (input value 2)
- pop (input value 3)
- jazz (input value 4)
- classical (input value 5)

Write an algorithm, using pseudocode **or** a flowchart, which:

- inputs the choice of all 1500 students (values 1 to 5)
- outputs all the names of the students who chose classical music
- outputs the percentage who chose **each** option.

[5]