



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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COMPUTER STUDIES

0420/12

Paper 1

May/June 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

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



- 1 (a) State **two** items found in typical technical documentation.

1

 2
 [2]

- (b) State **two** items found in a typical user guide.

1

 2
 [2]

- 2 **Four** types of data storage media and **four** descriptions are shown in the table below.

Tick (✓) the appropriate boxes in the table to match each data storage medium to its most suitable description.

	CD-ROM	DVD-RAM	fixed hard disk	memory stick
storage medium where data can only be read and not altered				
portable medium which allows transfer of data between computers				
memory where operating systems and applications software are usually stored				
medium which allows recording and playback to occur at the same time				

[4]

3 Three common devices are listed below:

- MP3 player
- digital camera
- mobile phone

- (a) Choose **one** of the above devices.
Describe the type of internal memory the device uses.
Describe how data is transferred from the device to a computer.

Device

Type of internal memory used

.....

.....

.....

Method of transferring data to a computer

.....

.....

..... [2]

- (b) Modern mobile phones include a digital camera and an MP3 player.

- (i) Give **one** disadvantage when compared to a dedicated MP3 player.

.....

.....

- (ii) Give **one** disadvantage when compared to a dedicated digital camera.

.....

..... [2]

- 4 (a) Computer systems can introduce a number of health and safety issues in the office.

Five potential risks are shown below. Indicate by ticking the appropriate column whether the risk is a **health** issue or a **safety** issue.

potential risk	health issue	safety issue
repetitive strain injury (RSI) caused by excessive clicking of a mouse or typing		
trailing wires connected to a computer system		
ozone gas and toner particles produced during laser printer operation		
headaches and eye strain caused by glare from a computer monitor/screen		
electrocution caused by spilling liquids on a computer system		

[5]

- (b) Introduction of computer systems can also have an impact on the workers in the office.

Give **three** potential ways computers can affect the office workers.

1

.....

.....

2

.....

.....

3

.....

.....

[3]

- 5** **Five** definitions are given on the left hand side of the diagram below. **Five** computer terms are shown on the right.

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By drawing arrows, connect each definition to the correct computer term.

website that allows virtual communication; user joins a site and invites friends who, in turn, invite their own friends

chat room

technology that allows telephone calls to be made using computer networks, such as the Internet

social networking

online "place" where a group of people get together and discuss a number of topics

tagging

software that allows any user to freely create and edit a web page using their own web browser

VoIP

marking, saving and archiving certain websites or items (such as photos); for example, it allows users to track and organise favourite websites or photos

wiki

[4]

6 Five students made the following statements.

Explain why each statement is **incorrect**.

(a) "I always use CD-ROMs to save my data."

.....

.....

..... [1]

(b) "The advantage of WiFi in the home is you don't need the use of a telephone line connection."

.....

.....

..... [1]

(c) "Satellite navigation systems in cars send signals to satellites so that the satellite can work out where they are."

.....

.....

..... [1]

(d) "Sending an email will cause a problem if the recipient is in another time zone where the time difference is 12 hours."

.....

.....

..... [1]

(e) "Video conferencing allows meetings to be called at any time."

.....

.....

..... [1]

7 The speed at which a CD spins in a portable music CD player is controlled by sensors and a small microprocessor.

(a) Describe how the sensors and microprocessor are used to control the speed of the spinning CD.

[4]

(b) Sudden movements can make the CD “skip”.

How can the microprocessor deal with this so that the CD operates correctly?

[2]

(c) Why would an MP3 player not suffer from the same problem?

[1]

8 Expert Systems are made up of a number of components.

(a) The diagram below shows **four** of these components and **four** definitions.

By drawing arrows, link the four components to their correct definitions:

made up of a series of <i>if ... then</i> statements called inference rules	Inference Engine
provides reasoning mechanism in a typical expert system	Knowledge Base
presents questions and information to a user and allows them to input a response	Rules Base
collection of facts used to solve problems in an expert system	User Interface

[3]

(b) Describe **three** of the limitations associated with using **Expert Systems**.

1

.....

.....

2

.....

.....

3

.....

.....

[3]

- 9 Thin film technology is becoming increasingly common. This uses material as thin as a sheet of paper but which acts just like an LCD monitor. A microprocessor is used to control the device and solid state memories are used to supply the data.

(a) Describe **two** advantages of thin film technology.

- 1
-
-
- 2
-
- [2]

(b) Describe **two** applications that could use thin film technology.

- 1
-
-
- 2
-
- [2]

- 10** A company uses an intranet which can also communicate with the outside world through the Internet.

(a) The system uses modems.

What is the purpose of a modem?

.....

.....

..... [1]

(b) Part of the company's security strategy is to use a firewall.

Describe **two** features of a firewall.

1

.....

.....

2

.....

..... [2]

(c) Connecting to the Internet can cause potential problems.

State **two** of these problems.

1

.....

2

..... [2]

- 11 A survey of motorways was carried out and a database was produced. A section of the database is shown below.

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Motorway ID	Length (km)	Cars per day	Toll charge per km (\$)	Number of lanes
M1	100	50 000	0.60	2
M2	210	75 000	0.40	3
M3	180	60 000	0.50	4
M4	40	20 000	0.30	3
M5	25	15 000	0.10	2
M6	100	40 000	0.70	4
M7	30	10 000	0.40	2
M8	150	60 000	0.60	4

- (a) How many fields and how many records are shown?

(i) number of fields

(ii) number of records [2]

- (b) Using **Motorway ID** only, what would be output if the following search condition was used?

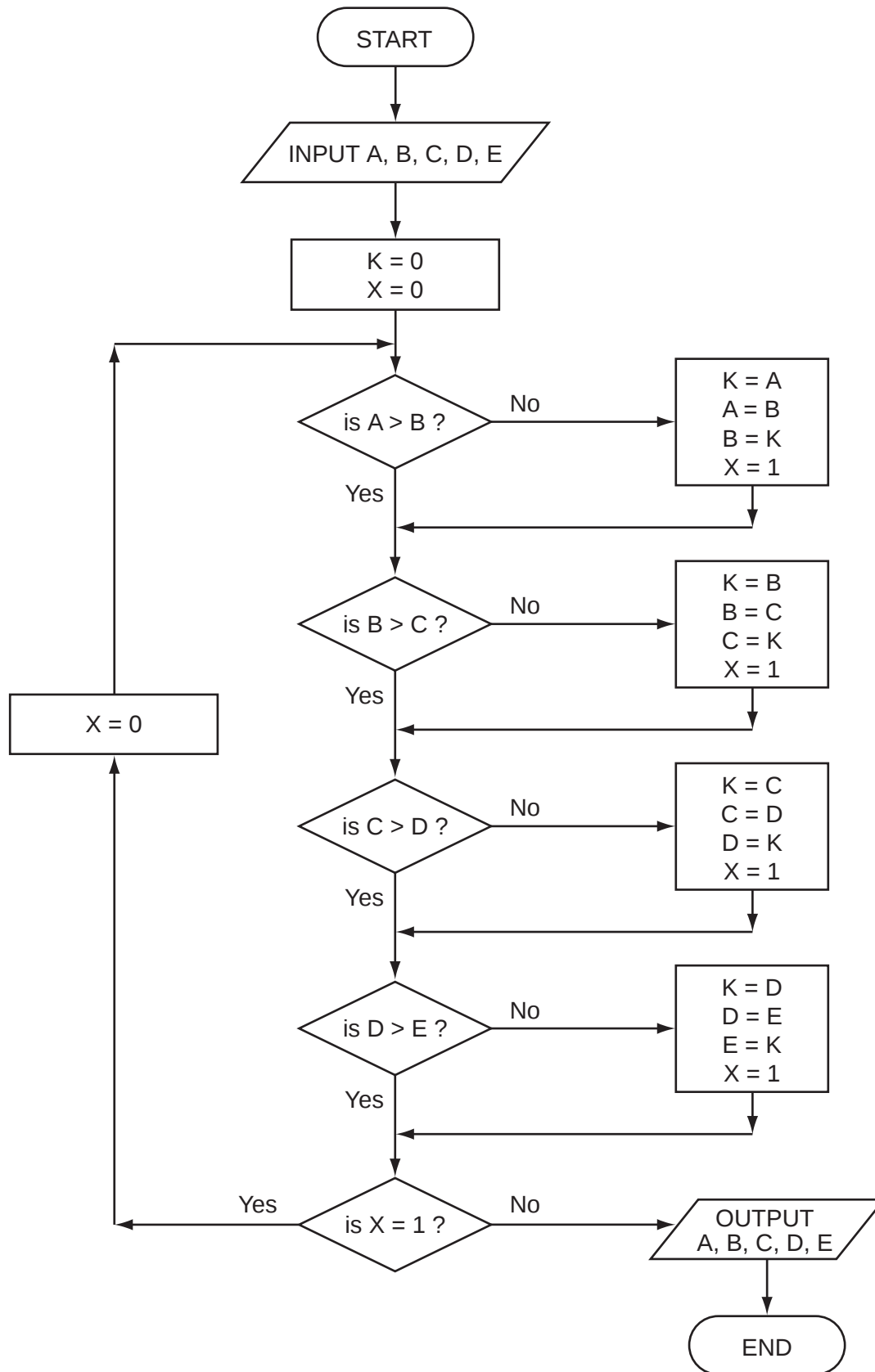
(Length (km) > 100) AND (Number of lanes > 3)

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

- (c) What search condition is needed to find the motorways where the number of cars per day exceeds 50 000 or the toll charge per kilometre is greater than \$0.50?

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

12 Study the following flowchart very carefully.



(a) Complete the trace table for this flowchart using the following test data:

3, 5, 1, 4, 8

A	B	C	D	E	K	X

[5]

(b) What values are output from the flowchart using the above test data?

.....
 [1]

(c) What function is this flowchart carrying out?

..... [1]

(d) What would happen if the value of X wasn't set to 0 in the return loop of the flowchart?

.....
 [1]

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13 A company requests new customers who register online to give the following details:

- name
- address
- type of credit/debit card
- payment card number

All details must be entered.

(a) (i) Describe **one** suitable different validation check for each field.

name

.....

address

.....

type of credit/debit card

.....

payment card number

..... [4]

(ii) Which of the four fields could be offered as a drop down box?
Explain.

.....

.....

.....

..... [2]

(b) Other data required:

- date of birth
- male or female
- accept/decline company conditions

Describe suitable input methods for this data.

date of birth

.....

male or female

.....

accept/decline company conditions

..... [3]

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- 14 Some decorative lights are made up from a cluster of *red*, *blue*, *green*, *yellow* and *white* LEDs.

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Each colour is represented by a binary code:

32	16	8	4	2	1	
1	0	0	0	0	0	red
0	1	0	0	0	0	blue
0	0	1	0	0	0	green
0	0	0	1	0	0	yellow
0	0	0	0	1	0	white
0	0	0	0	0	1	black (all lights off)

A 6-bit register, R1, stores the 1-values to represent a sequence of colours.
Thus, if R1 contains:

0	1	0	1	0	1
---	---	---	---	---	---

this means the **blue**, **yellow** and **black** colour sequence is stored and displayed in that order.

The length of time each light is on is set by a binary value in another register, R2:

Thus

0	1	0
---	---	---

means each colour is on for 2 seconds.

- (a) The two registers contain the following values.

What is the sequence of coloured lights **and** the timing for each colour?

R1						R2		
0	1	1	0	1	0	1	1	1

sequence of colours

.....

.....

timing

..... [2]

- (b) What will the two registers contain if the coloured light sequence is **red**, **green** and **black** and the timing is 5 seconds?

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R1	R2									
<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>							<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			

[2]

- (c) What is the problem with trying to display **green**, **blue**, **red** in that order?

.....

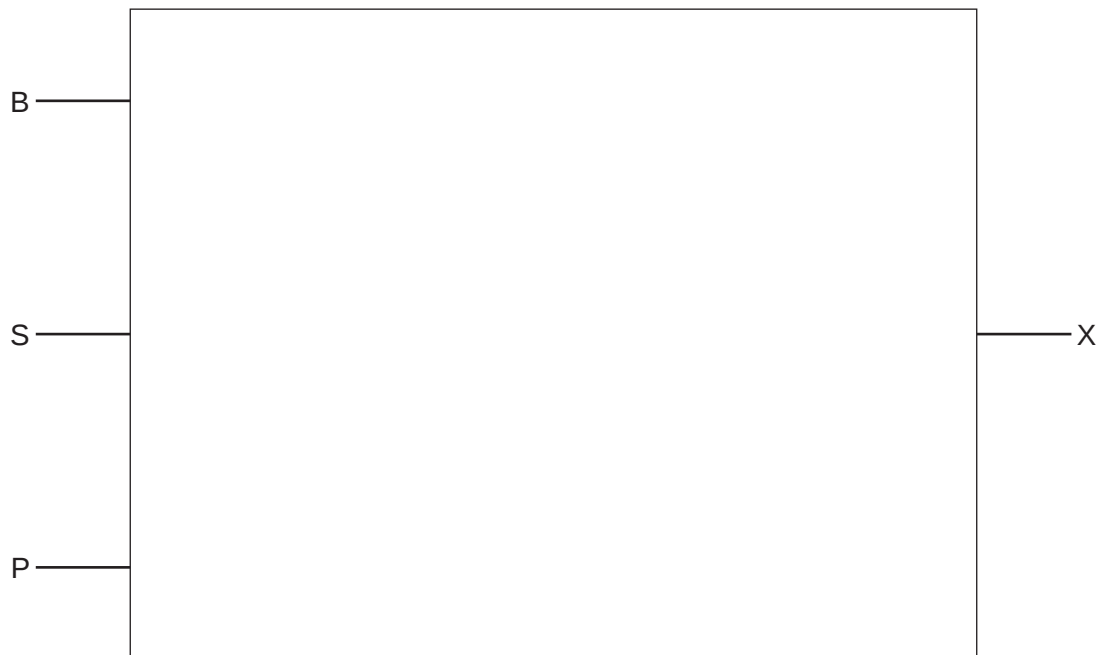
.....

.....

..... [2]

15 (a) Draw the logic circuit represented by the logic statement:

$X = 1$ if (B is NOT 1 AND S is NOT 1) OR (P is NOT 1 AND S is 1)



[6]

(b) Complete the truth table for the above logic statement.

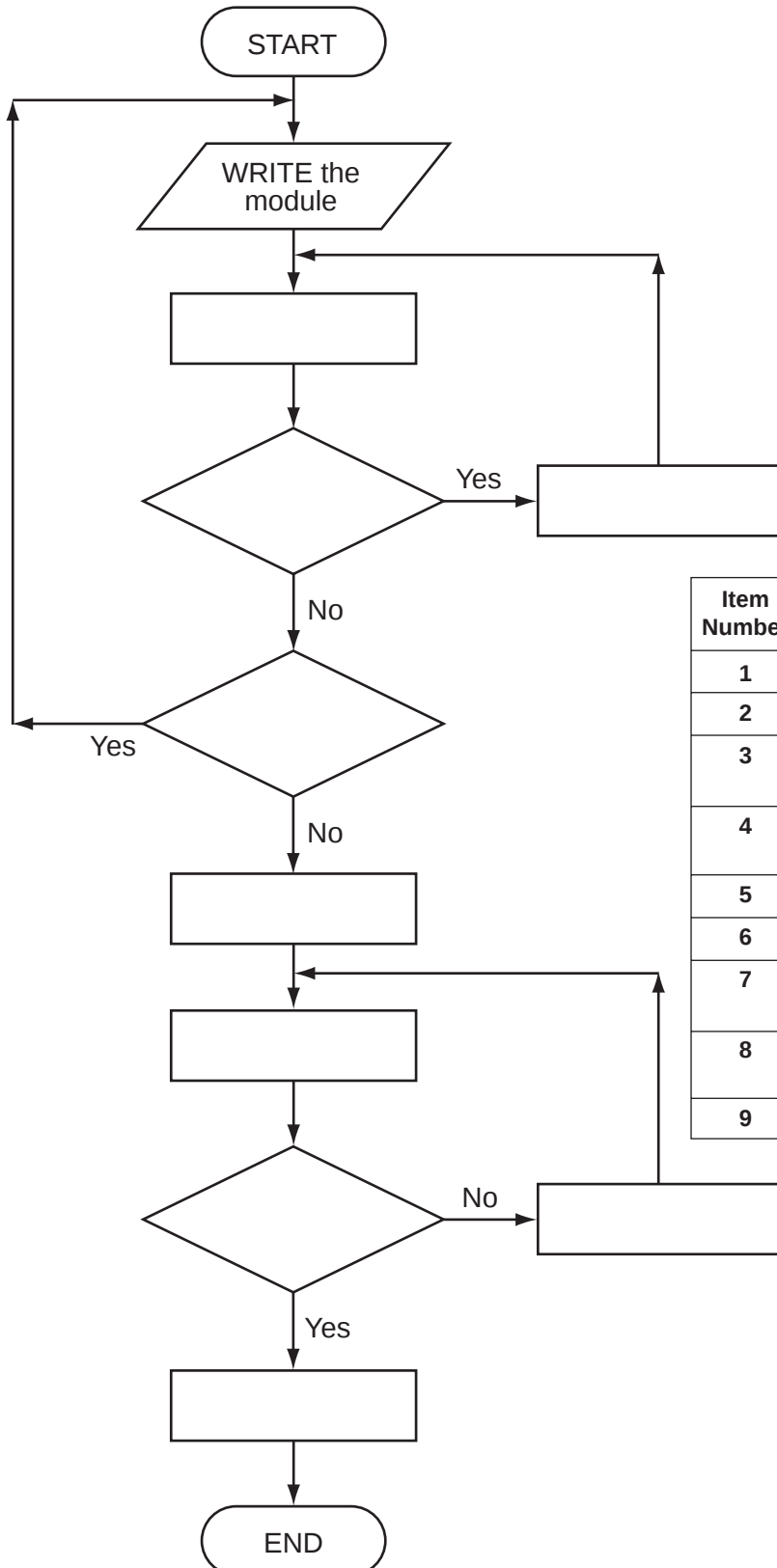
			Working space	
B	S	P		X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

- 16 A large word processor is being developed by first writing a series of modules. These are then put together to form the final word processor. Testing is done on each module and on the final word processor. The following flowchart shows how this word processor is developed. Several of the stages have been omitted.

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



ITEM LIST

Item Number	Item Description
1	any errors in the module?
2	any more modules to write and test?
3	combine all modules to form final word processor
4	does final word processor give expected results?
5	modify final word processor
6	modify the module
7	test module using data with known outcomes
8	test final word processor using data with known outcomes
9	write user documentation

[5]

- | | |
|-----|----------------|
| 444 | Yodafone |
| 555 | N2 network |
| 666 | Koffee mobile |
| 777 | Satsuma mobile |

[6]