Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER					

COMPUTING **9691/11**

Paper 1 **May/June 2015**

1 hour 30 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.

This document consists of **15** printed pages and **1** blank page.

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CAMBRIDGE
International Examinations

1 A retail company dispatches goods from one of its four warehouses. The company ha d and tested a new stock management system. This new system is about to be installed use.

(a) Describe **two** tasks that are part of the installation process.

1 ....

....

2 ....

.... [2]

(b) There are several methods of changing over to a new system when it is installed.

The company must choose between direct, parallel or pilot changeover.

(i) Describe what is meant by parallel changeover and pilot changeover.

Parallel changeover

....

....

....

Pilot changeover

....

....

.... [3]

(ii) Give **one** advantage of each method in **part (b)(i)** when compared to direct changeover.

Parallel changeover

....

....

Pilot changeover

....

.... [2]

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(c) Once the stock management system is operational, it needs to be maintained.

Describe each type of maintenance shown. Give an example which requires each maintenance for this system.

Corrective ....

....

Example ....

....

Adaptive ....

....

Example ....

....

Perfective ....

....

Example ....

.... [6]

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2 **(a)** A stack is initially empty.

The following sequence of operations is then performed:

Push value 4
Push value 8
Push value 3
Pop value
Push value 5

Show the contents of the stack after each operation.

[2]

(b) A queue is initially empty.

The following sequence of operations is then performed:

Insert value 4
Insert value 8
Insert value 3
Remove value
Insert value 5

Show the contents of the queue after each operation.

[2]

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3 **(a)** Six storage media and three types of storage technology are shown below.

Draw a line to link each storage medium to the appropriate storage type.

Storage medium

CD-ROM

SD/XD memory card

DVD-R

Blu-ray disc

External hard disk

Pen drive/memory stick

Storage type

Magnetic

Optical

Solid state

[6]

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(b) A toy designer is developing a new model aeroplane. The model will be radio-co ll contain a microprocessor.

(i) The model aeroplane needs memory to allow:

- the designer to store fixed data such as the factory settings
- the operator to use one of the pre-programmed manoeuvres
- the operator to program their own manoeuvres
- the operator to store their own program manoeuvres for future use

Name **two** types of memory needed by the model aeroplane.

Justify your choice of memory in each case.

Type 1 ....

Justification ....

....

....

Type 2 ....

Justification ....

....

.... [4]

(ii) The user programs new manoeuvres using a hand-held device.

Name a suitable type of user interface and justify your choice.

Name ....

Justification ....

....

....

.... [3]

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4 At a supermarket, automatic stock control is used. The barcode on each item sold [illegible] a point-of-sale (POS) terminal.

The following steps, when put into the correct sequence, describe how the barcode is us [illegible] automatic stock control.

Put the steps into the correct sequence using the numbers 2 to 7. The first one has been done for you.

Step	**Sequence number**
The new stock level is written back to the item record	
The barcode on the item is read at the POS terminal	**1**
When the stock item is found, data are sent back to the POS terminal	
If the stock level <= re-order level, items are automatically ordered	
The database is searched using the barcode as the key field	
The stock level is reduced by 1	
The stock level is compared to the re-order level	

[5]

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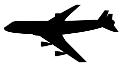
5 The control room at a busy airport monitors all incoming and outgoing flights. The co s show the following data list for each flight:

- flight number
- height above ground (km)
- distance from airport (km)
- speed of aeroplane (km/hour)
- grid position

The graphic for flight BZ104 with its data list is shown below:



BZ104
1.20
40
215
D4

(a) State how the graphic could be used to distinguish between incoming and outgoing flights.

....

.... [1]

(b) Each graphic with its data list is refreshed every ten seconds.

(i) Describe what is meant by refresh.

....

.... [1]

(ii) Give **one** reason why each graphic and data list are refreshed every ten seconds.

....

.... [1]

(c) Give **two** essential features of the control screens.

Explain why these are essential for this application.

Feature 1 ....

Explanation ....

....

Feature 2 ....

Explanation ....

.... [4]

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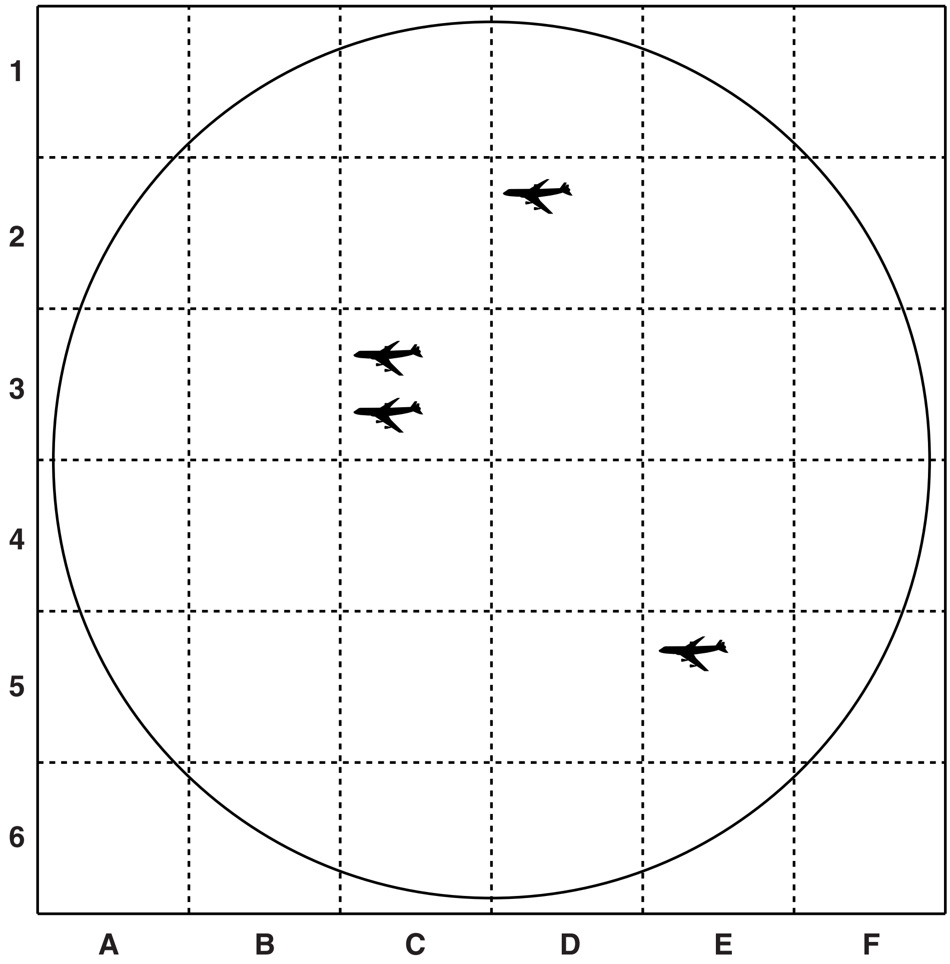
(d) A grid is used to show the position of all flights within a 100 km radius. Data for fl e this radius are stored by the computer system but not displayed.

Six of the flights currently stored in the computer system are:

AT051	BZ106	DR191	KK044	PP204	XX111
1.35	2.00	1.00	3.00	0.67	4.00
20	60	30	120	15	180
150	300	180	400	140	450
C3	E5	D2		C3	

The screen below shows the four flights currently within the 100 km radius.

(i) Add to the screen display the essential data list item(s) to identify each flight.



[2]

(ii) Describe how the other data list items could be displayed when required.

....

.... [1]

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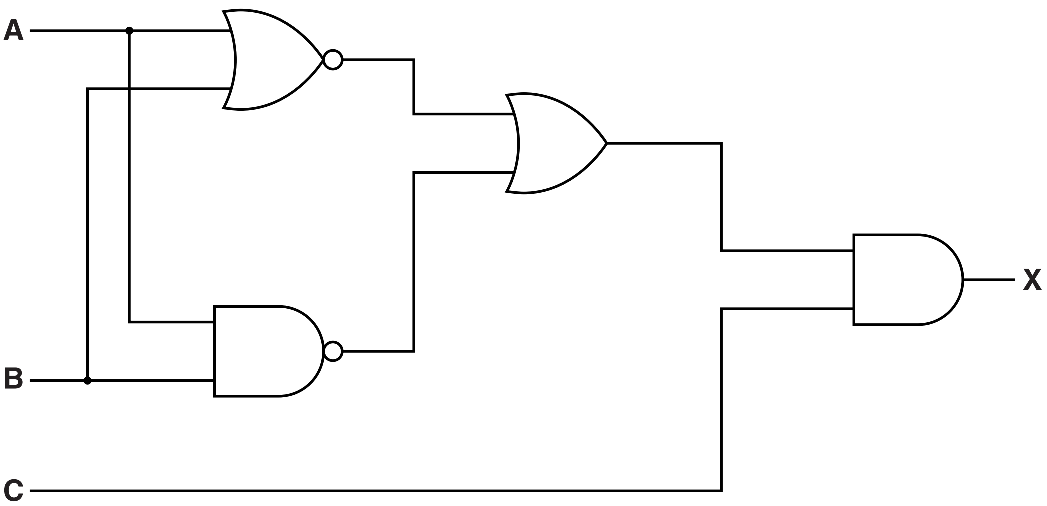
6 The following logic circuit is used to monitor part of a chemical process. A, B and values input to the logic circuit from the chemical process.

X is the binary value output from the logic circuit.



(a) Complete the truth table for this logic circuit.

A	B	C	Workspace	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]

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The output, X, from the logic circuit is sampled every 30 seconds by a computer.

The sequence of output values is stored in a block of 1 byte memory locations. Each byte seven samples, filling from position 0 to position 6. Position 7 is reserved as a parity bit.

(b) **(i)** Give the denary value if the byte contains:

7	6	5	4	3	2	1	0
0	1	1	1	1	0	0	0

.... [1]

(ii) Show what binary value must be stored in the byte to represent the denary value 43.

7	6	5	4	3	2	1	0

[1]

(c) As soon as ten bytes are filled, the data are sent to a central computer.

(i) The data are sent using half-duplex, serial transmission.

Explain these terms:

Half-duplex ....

....

Serial transmission ....

.... [2]

(ii) The transmission uses a protocol.

Describe what is meant by a protocol.

....

....

Describe why a protocol is necessary.

....

....

.... [2]

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(d) Even parity is used to check whether any errors occurred during transmission.

The table below shows the first ten byte samples received by the central computer. A byte (the parity byte) is sent after each block of ten bytes.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	0	1	0	0	0	1	1	1
byte 2	1	1	1	0	0	1	1	1
byte 3	0	0	0	0	1	1	0	0
byte 4	1	1	1	0	0	1	0	0
byte 5	1	0	0	1	1	0	1	0
byte 6	1	1	0	0	0	0	1	1
byte 7	1	1	1	1	0	0	0	1
byte 8	0	1	1	0	1	1	0	0
byte 9	1	0	0	0	0	0	0	1
byte 10	0	0	0	1	1	1	1	0
parity byte	0	0	0	1	0	1	1	1

One of the received bytes contains a single error.

(i) Identify the byte that contains the incorrect bit.

.... [1]

(ii) Identify the bit position that contains the incorrect bit.

.... [1]

(iii) Explain why, when using this parity block system, that there is no need for the incorrect byte to be re-transmitted.

....

....

.... [2]

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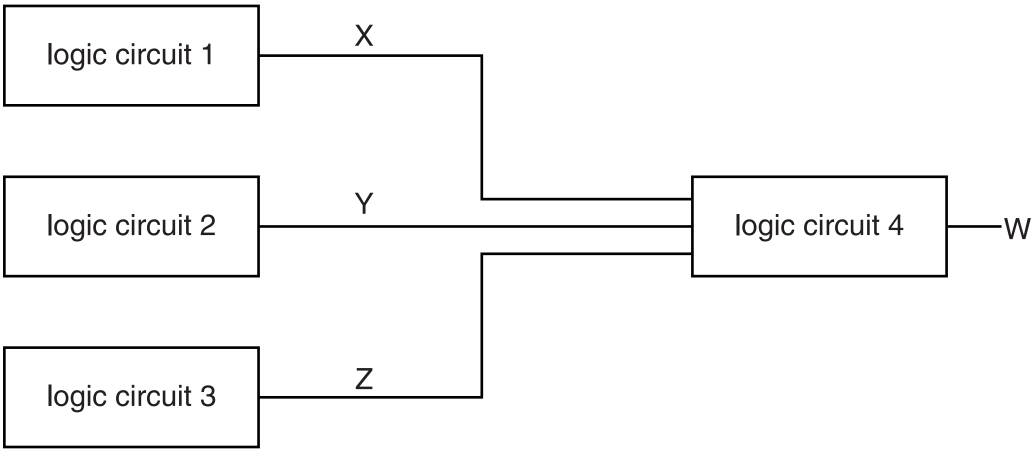
(e) There are three parts of the chemical process being monitored. Each part is mo s own logic circuit.

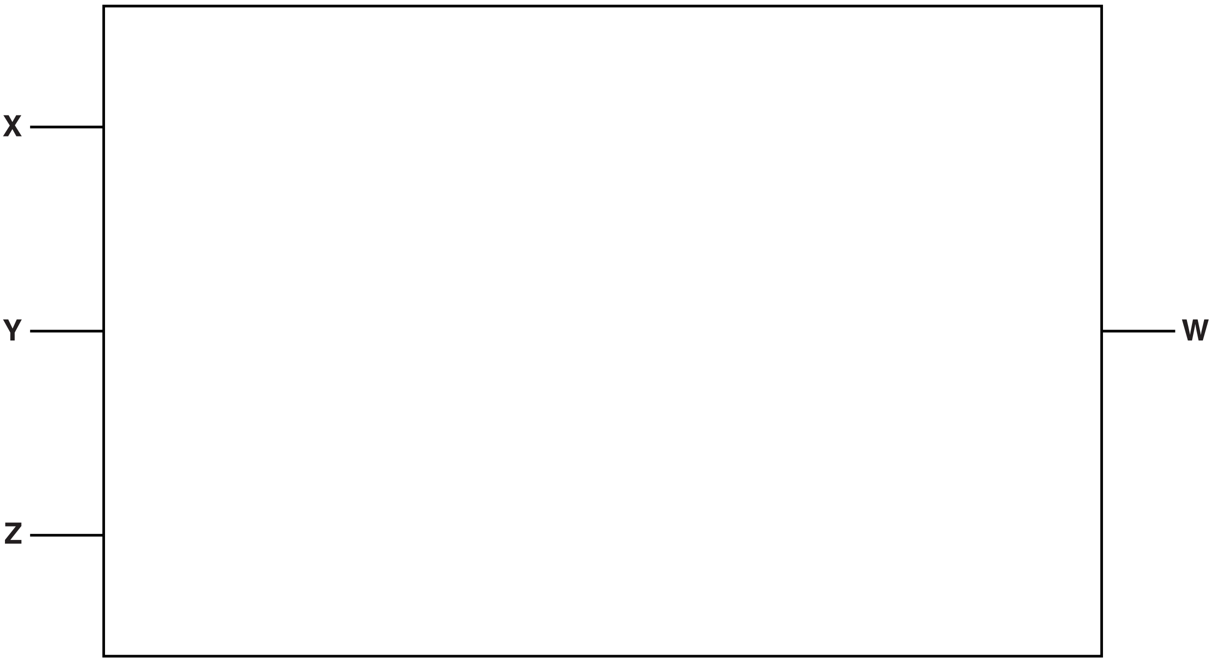

logic circuit 1
X
logic circuit 2
Y
logic circuit 4
W
logic circuit 3
Z

A fourth logic circuit has X, Y and Z as inputs. The output, W, determines whether or not the chemical process should be stopped.

W has a value of 1 if:

(X = 1 OR Y = 1) OR (Y = 1 AND Z = 0)

Draw a logic circuit to represent the above process.



[4]

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7 **(a)** A website sells products using an online order form.

A user enters their:

- date of birth (DD/MM/YYYY)
- credit card number (16 digits)
- telephone number
- postal address
- email address

(i) Three of the items above undergo a validation check.

Identify the three items that can be validated.

Give a suitable validation check. Each should be different.

Item 1 ....

Validation check ....

....

Item 2 ....

Validation check ....

....

Item 3 ....

Validation check ....

.... [3]

(ii) Name the method where data are entered twice for checking purposes.

....

Name the item which will undergo this method.

Give a reason for your choice.

Item ....

Reason ....

.... [3]

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(iii) The order form uses drop-down lists for one of the five items.

Identify this item. Give a reason for your choice.

Item ....

Reason ....

.... [2]

(b) The website contains pages showing photos of the products and product details.

Name **two** types of software that could have been used in the development of the website.

Give a reason for your choice in each case.

Software type 1 ....

Reason for choice ....

....

....

Software type 2 ....

Reason for choice ....

....

.... [4]

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