Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME	

CENTRE NUMBER					

CANDIDATE NUMBER				

COMPUTING **9691/11**

Paper 1 **October/November 2014**

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 a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
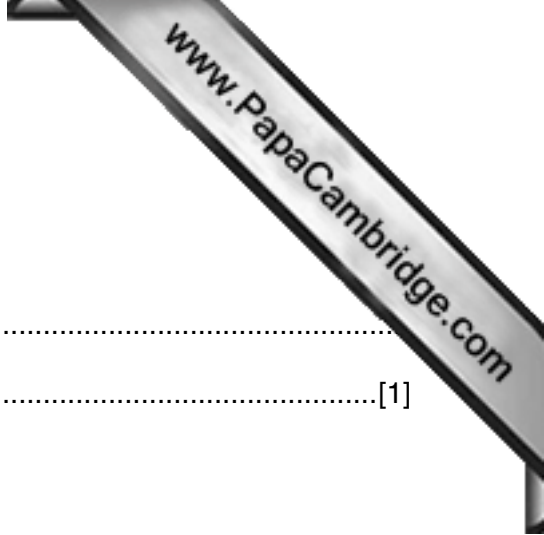DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
No marks will be awarded for using brand names for 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 **13** printed pages and **3** blank pages.

[Turn over

1 Describe the function of the following parts of a processor:

   (i) control unit

   ....

   ....[1]

   (ii) main memory unit

   ....

   ....[1]

   (iii) arithmetic and logic unit (ALU)

   ....

   ....[1]

2 In 1994, an oil company introduced a new computer system. The new system was a computer control system to operate an oil refining process.
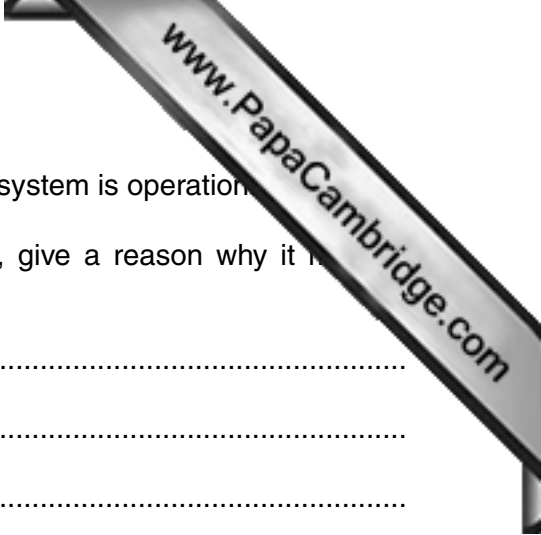
   (a) (i) This computer system has now been in operation for twenty years.

   What major issues with the system is the oil company likely to be faced with?

   ....

   ....

   ....

   ....

   ....[2]

   (ii) Describe how the issues you identified in **part (a)(i)** can be overcome.

   ....

   ....

   ....

   ....

   ....[2]

(b) One stage in the system's life cycle is maintenance once the system is operation

Name **three** different types of maintenance. For each type, give a reason why it
required.

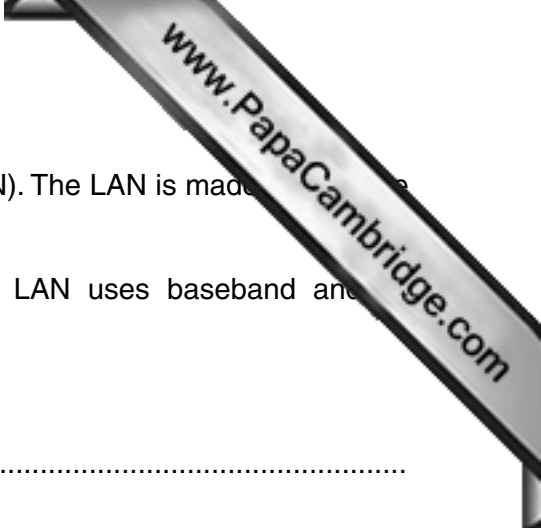1 ....

....

....

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2 ....

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3 ....

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....

....[6]

[Turn over

3 A technician has recently created a wired local area network (LAN). The LAN is mad̶e̶... ̶computers, a router and a printer.

The network uses two different types of communication. The LAN uses baseband an̶d̶ ̶... connection to the Internet uses broadband.

(a) Explain what is meant by **baseband** and **broadband**.

baseband ....

....

....

....

....

broadband ....

....

....

....

....[4]

**(b)** Column **A** shows **three** types of data transmission. Column **B** shows definition[s]~~. C~~ shows examples.

Draw lines to:
- link up each term in column **A** with its correct definition in column **B**
- cross out the unused definition in column **B**
- link up the **three** remaining definitions in column **B**, with the appropriate example in column **C**

A	B	C
Simplex	Data transmission in both directions at the same time	Telephone conversation
Half duplex	Data transmission in one direction only	Data transmission check
Full duplex	Data transmission from different sources sent at the same time in both directions	Two-way radio communication
	Data transmission in both directions, but only in one direction at a time	Global positioning satellite signals

[6]

[Turn over
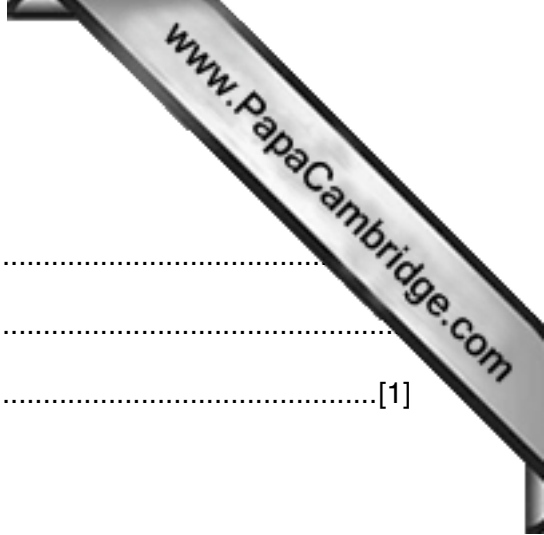
4 (a) What is meant by a computer virus?

....

....

....[1]

(b) It is important to protect a computer system from viruses.

Describe **three** different ways to do this.

1 ....

....

....

2 ....

....

....

3 ....

....

....[3]

5 The table below represents a data structure. It is called `BinaryNumber` and stores:

- the place values for a binary integer, in the locations represented by the first row of the
- the bits of a binary number, in the locations represented by the second row of the table

128	64	32	16	8	4	2	1
0	1	1	0	1	0	1	1

(a) What is the denary value of this binary number?

....[1]

(b) (i) What type of data structure is `BinaryNumber`?

....[2]

(ii) The pseudocode below stores values in the data structure as follows:

- it initialises the place values in the locations represented by the first row
- it stores input data in the locations represented by the second row

Complete the missing parts.

```
DECLARE BinaryNumber[2,8] : ………………… OF INTEGER

PlaceValue ← 128

FOR Index ← 1 TO …………………

    INPUT BinaryNumber[2, …………………]

    BinaryNumber[…………………,Index] ← PlaceValue

    PlaceValue ← PlaceValue / 2

ENDFOR
```

[4]

[Turn over

6 A wind turbine must shut down when certain conditions are met.

The three variables and the conditions which dictate their values are shown in the table:

variable		binary value	condition
name	**description**		
W	wind speed	1	wind speed $\geqslant$ 100 kilometres per hour (kph)
		0	wind speed $<$ 100 kilometres per hour (kph)
P	oil pressure	1	oil pressure **low**
		0	oil pressure **normal**
T	motor temperature	1	motor temperature $\geqslant$ 50°C
		0	motor temperature $<$ 50°C

A logic circuit is to be designed where the output, **X**, is 1 if:

either   wind speed $\geqslant$ 100 kph and oil pressure normal

or   motor temperature $\geqslant$ 50°C and oil pressure low

or   wind speed $<$ 100 kph and motor temperature $\geqslant$ 50°C

(a) Draw a logic circuit.
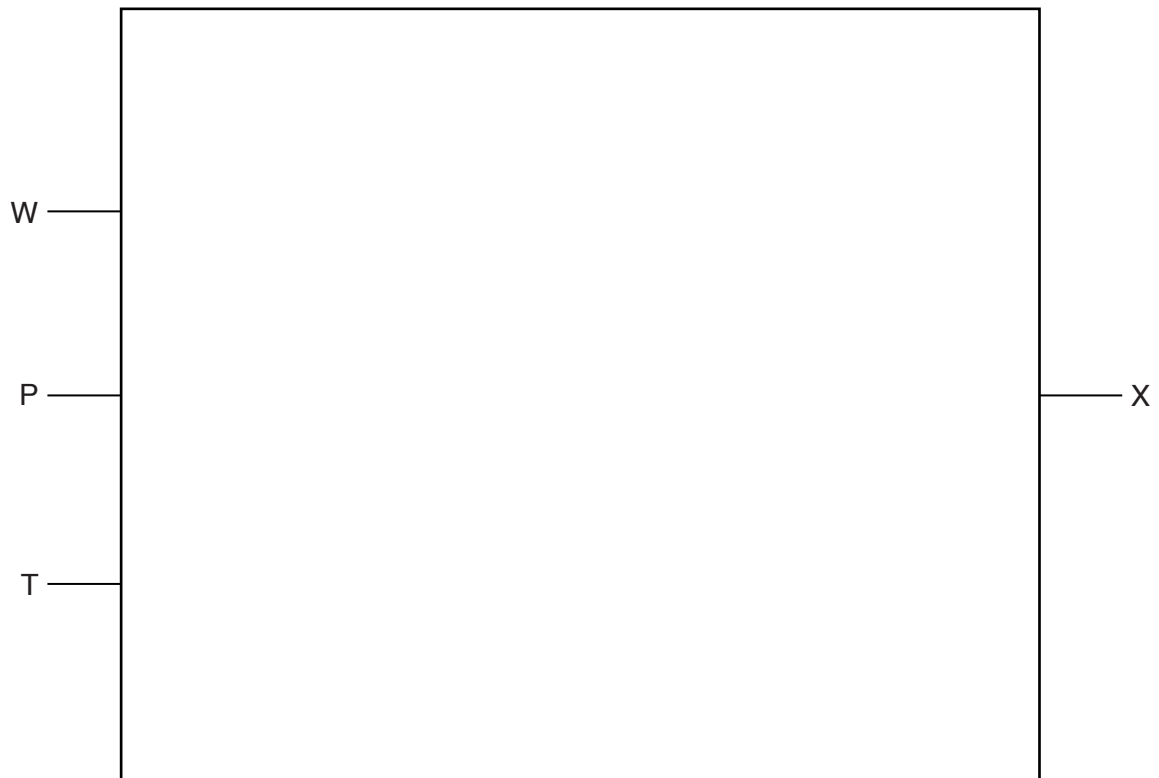
[7]

(b) Complete the truth table for this system:

W	P	T	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]

[Turn over
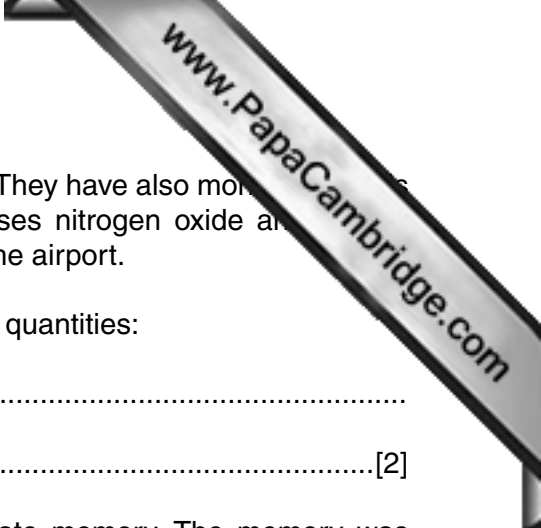
7 Researchers have been monitoring noise levels at a large airport. They have also mo............. of air pollution. The pollutants that they monitored were the gases nitrogen oxide a............. dioxide. Monitoring devices were placed around the boundary of the airport.

(a) Name **a** suitable device to measure each of the **two** following quantities:

noise level ....

air pollution level ....[2]

(b) Data from the monitoring devices were saved in a solid state memory. The memory was housed in a secure box at the airport. Each month, the data stored in this solid state memory were transferred to the researchers' computer on another site.

Describe how the data could be transferred.

....

....

....[1]

(c) Describe how software could be used to show changes in both noise levels and air pollution levels from month to month and long term trends.

....

....

....

....

....

....

....[3]
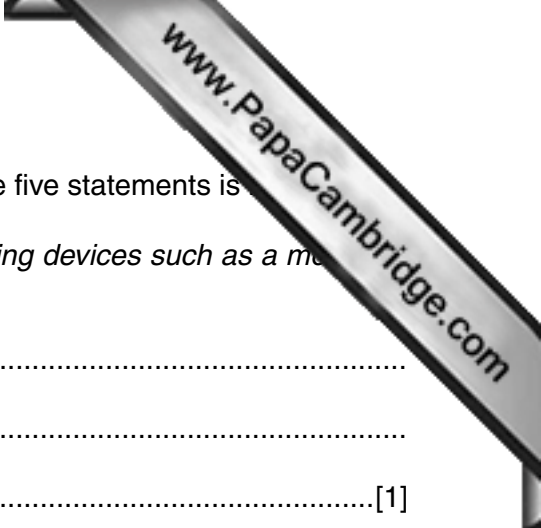
8 Students wrote the following statements. Describe why each of the five statements is

(i) *"Command line interfaces (CLI) are used primarily with pointing devices such as a m*
with a touch screen"

....

....

....[1]

(ii) *"Binary numbers such as 0 1 1 1 0 0 0 1 and 1 0 0 1 0 0 1 1 are said to have **odd parity***
because they represent odd values (113 and 147 in denary)"

....

....

....[1]

(iii) *"Batch Processing can be used to control a central heating system because it is automatic,*
collects considerable amounts of data and requires no human intervention"

....

....

....[1]

(iv) *"WANs differ from LANs in that WANs make use of wireless connectivity"*

....

....

....[1]

(v) *"A stack data structure operates on a First-In-First-Out (FIFO) basis"*

....

....

....[1]

[Turn over

9 An expert system is used in a garage workshop to diagnose faults in a car engine.

Part of the user interface is shown below. The mechanic answers each question with YES o

	YES	NO
Does the ignition light come on?	✓	
Does the oil warning light stay on?	✓	
Does the car start?		✓

(a) The mechanic needs to communicate with the software.

Choose a suitable input device.

....

Explain your choice.

....

....

....[2]

(b) The mechanic needs help to identify possible faults with the engine.

Describe the steps taken by the expert system.

....

....

....

....

....

....[3]

(c) When this expert system was being developed it underwent a series of tests.

Describe how these tests were carried out.

....

....

....

....[2]

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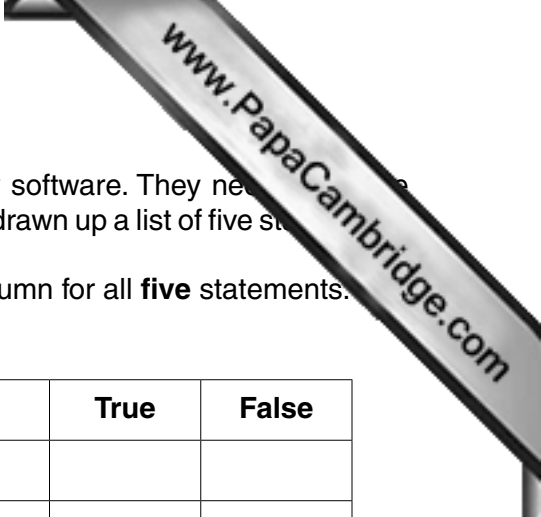
10 The managers of an engineering company are about to buy new software. They ne‌‌‌‌‌ whether to buy off-the-shelf or custom-written software. They have drawn up a list of five s‌

(a) Complete the table below by ticking (✓) the **True** or **False** column for all **five** statements.

Statement	True	False
custom-written software takes a long time to develop		
custom-written software is not fully tested		
custom-written software will not have any technical backup		
off-the-shelf software is usually cheaper because costs are shared		
off-the-shelf software is always compatible with other software		

[4]

(b) For each type of software, describe **one** further benefit.

off-the-shelf ....

....

....

custom-written ....

....

....[4]

(c) Software is supplied with documentation. Part of the documentation is for users. This contains sections for the hardware requirements and installation instructions.

List **four** other sections you would expect to find in the user documentation.

1 ....

....

2 ....

....

3 ....

....

4 ....

....[4]

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