



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
 General Certificate of Education
 Advanced Subsidiary Level and Advanced Level

CANDIDATE
 NAME

CENTRE
 NUMBER

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CANDIDATE
 NUMBER

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COMPUTING

9691/13

Paper 1

May/June 2013

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, highlighters, 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 **12** printed pages.



1 (a) What is an operating system?

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

(b) There are two different types of real-time operating system.

Give an example application for each type. Explain why each application requires a real-time operating system.

Application 1

Explanation

.....
.....

Application 2

Explanation

.....
..... [4]

(c) Many household appliances contain embedded microprocessors.

Explain why most of these microprocessors don't need operating systems.

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

(ii) Describe the input devices you would expect to see in the control room. Justify your choice of devices.

For
Examiner's
Use

Input devices

Justification

[3]

4 Computer Aided Design (CAD) uses many specialist input and output devices.

Name **three** specialist input or output devices and describe what they are used for in the CAD package.

Device 1

Description

Device 2

Description

Device 3

Description

[6]

5 A table contains the values below:

3	4	1	4	5	3
2	1	6	-4	0	0
0	0	2	2	1	8

(a) Describe an array `MyTable` which would be suitable to store the above table.

.....

.....

.....

.....

.....

.....

..... [3]

(b) Using your answer for (a) show how the value **6** is referenced.

..... [1]

(c) The table should only contain values greater than 0. How could any values not meeting this criterion be located in the array, `MyTable`, and their position in that array identified?

.....

.....

.....

.....

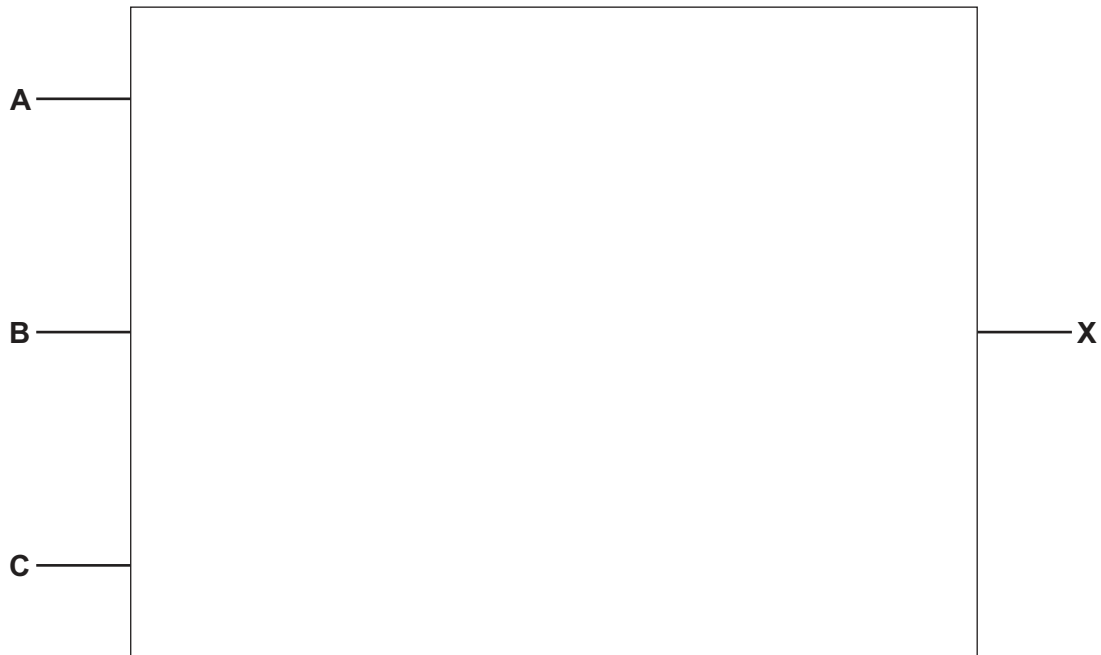
.....

.....

..... [3]

- 6 (a) Draw the logic circuit corresponding to the following logic statement:

$X = 1$ IF ((A is NOT 1 AND B is 1) OR (B is 1 AND C is 1)) OR (C is 1)



[5]

- (b) Complete the truth table for the above logic statement:

A	B	C	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]

For
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Use

7 A company has a number of shops that sell DVDs, CDs and books. Its existing computer system is no longer adequate. It has hired a systems analyst to develop improvements to in-shop customer sales, stock control and marketing.

(a) One part of the design is the file structures. Factors to consider include use of fixed length or variable length records.

Describe **four** more parts that the systems analyst will need to design. Include for each part the factors that need to be considered.

Part 1

Factors

.....

.....

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Part 2

Factors

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.....

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Part 3

Factors

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Part 4

Factors

.....

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..... [8]

8 The term **LOGIC GATES** is to be transmitted as 12 bytes of data.

For
Examiner's
Use

Each character in the term has an ASCII value. The system is using **odd parity** and the left-most bit is used as the parity bit. An additional parity byte is also sent after the term.

The following bytes arrived at their destination:

		1	2	3	4	5	6	7	8
	letters	bytes received							
1	L	0	1	0	0	1	1	0	0
2	O	0	1	0	0	1	1	1	1
3	G	1	1	0	0	0	1	1	1
4	I	0	1	0	0	1	0	0	1
5	C	0	1	0	0	0	0	1	1
6	<Space>	0	0	1	1	0	0	1	0
7	G	1	1	0	0	0	1	1	1
8	A	1	1	0	0	0	1	0	1
9	T	0	1	0	1	1	0	0	0
10	E	0	1	0	0	0	1	0	1
11	S	0	1	0	1	0	1	1	1
12	parity byte	0	1	0	0	1	1	1	1

(a) One of the bytes has an error after transmission.

(i) Locate which character contains the error.

..... [1]

(ii) Indicate which bit has been transmitted incorrectly.

column number

row number [1]

(iii) Explain how you arrived at your conclusion.

.....

 [3]

(b) The following bytes were sent during a data transmission:

0 0 1 1 0 0 0 1
1 0 0 1 1 0 1 1
1 1 1 0 0 0 0 0

For
Examiner's
Use

Explain how a checksum is used to check whether the bytes have been corrupted during data transmission.

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.....

.....

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.....

..... [3]

