

## **Cambridge International Examinations**

Cambridge International General Certificate of Secondary Education

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	
COMPUTER S	CIENCE		0478/12
Paper 1 Theory	У	Octo	ber/November 2016
			1 hour 45 minutes
Candidates and	swer on the Question Paper.		
No Additional N	Materials are required.		
No calculators	allowed.		

## **READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name in the spaces at the top of this page.

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 75.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.





(a) Give two reasons why a programmer would choose to write code in a low-level language.

1

	2		
(b)	High-level languages require either an interpreter of	or a compiler to trans	late the program
	The table below lists a number of statements about	t language translator	S.
	Tick (✓) to show which statements refer to interpre	ters and which refer	to compilers.
	Statements	Interpreter (✓)	Compiler (√
	Translates the source code into machine code all at once		
	Produces an executable file in machine code		
	Executes a high-level language program one instruction at a time		
	Once translated, the translator does not need to be present for the program to run		
	An executable file is produced		
Qtat	te <b>four</b> functions of an operating system.		
o			

3

Exp	lain what is meant by:	
(i)	Serial data transmission	
		.[2]
(ii)	Parallel data transmission	
		.[2]
		vay
Ider		
Giv.		
2		
		[3]
	(ii) A confrom Ider Give	

4 Nine bytes of data are transmitted from one computer to another. Even parity is used. An additional parity byte is also sent.

The ten bytes arrive at the destination computer as follows:

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

One of the bits was corrupted during the data transmission.

(a)	Circle the corrupt bit in the corrupt byte in the table above.	[1]
(b)	Explain how the corrupted bit was found.	
		.[2]

_	A computer	11000 00	0 hit	rogiotor
5	A combuter	uses an	o-nir	redister.

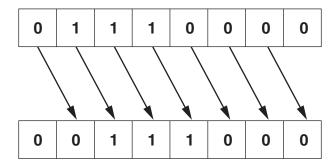
The 8-bit register contains binary integers.

(a) Write the denary (base 10) value represented by:

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

.....[1]

(b) All the bits in the register are shifted **one** place to the **right** as shown below.



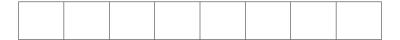
Write the denary number that is represented after this shift.	
---	--

F. 17
111

(c) State the effect the shift to the right had on the original denary number from part (a).

(d) The original number in **part** (a) is shifted **three** places to the **right**.

(i) Show the new binary number:



[1]

(ii) Write the equivalent denary number.

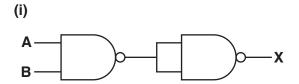
\_\_\_\_\_[1

(e)	Describe the problems that could be <b>five</b> places to the <b>right</b> .	e caused if the original binary number in <b>part (a)</b> is shifte
		[2
Fou	ır computer terms and <b>eight</b> descrip	tions are shown below.
Dra	w lines to connect each computer te	rm to the correct description(s).
	Computer term	Description
		Data can be read but not altered
	Arithmetic and logic unit (ALU)	Carries out operations such as addition and multiplication
		Stores bootstrap loader and BIOS
	Control unit	Fetches each instruction in turn
	Random access memory (RAM)	Carries out operations such as AND, OR, NOT
	memory (riziwi)	Stores part of the operating system currently in use
	Read only memory (ROM)	Stores data currently in use
		Manages execution of each instruction

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6

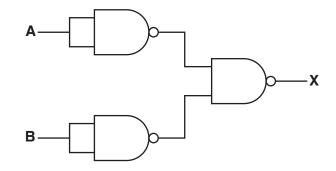
7 (a) Complete the truth tables and name the single logic gate that could replace each logic circuit:



Α	В	Working space	х
0	0		
0	1		
1	0		
1	1		

Single logic gate .....[3]

(ii)

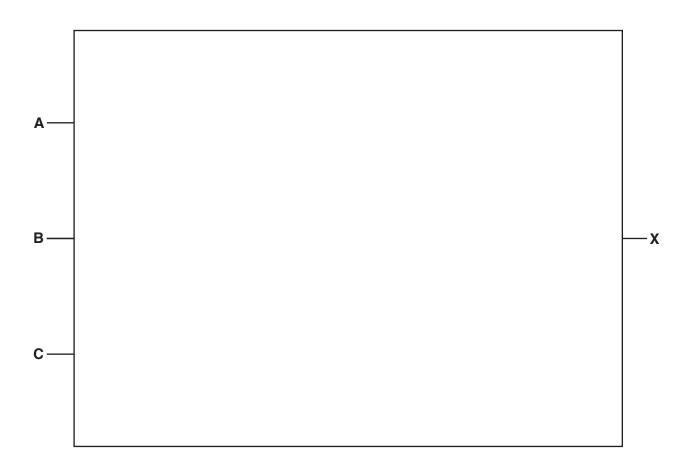


A	В	Working space	x
0	0		
0	1		
1	0		
1	1		

Single logic gate .....[3]

**(b) (i)** Draw a logic circuit to represent the following logic statement:

$$X = 1 \text{ if } (A = 1 \text{ AND } B = 1) \text{ OR } ((B = NOT 1) \text{ AND } C = 1)$$



[4]

(ii) Complete the truth table for the logic statement in part (b)(i).

A	В	С	Working space	х
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]

8 Identify whether the **four** statements about file compression are correct by writing TRUE or FALSE in the following table.

Statement	TRUE or FALSE
MIDI files store the actual music notes in a compressed format	
JPEG files are examples of lossless file compression	
MP3 files are, on average, 90% smaller than the music files stored on a CD	
MP4 files are examples of lossy file compression	

[4]

(a) Explain what is meant by a denial of service attack.

[2]

(b) Name and describe two other potential security threats when using the Internet.

Security threat 1

Description

Security threat 2

Description

[4]

10	(a)	Describe what is meant by HTML.	
			.[3]
	(b)	The following URL is typed in:	
		http://www.cie.org.uk/ComputerSciencePapers	
		This URL is composed of three parts.	
		State the part of this URL that is the:	
		File name	
		Protocol	
		Web server name	[3]

11		A security system is installed in a house. A hexadecimal number is entered to activate or deactivate ne alarm.						
	(a)	The alarm code is set to hexadecimal number 2 A F						
		Show how this number would be stored in a 12-bit binary register.						
			[3]					
	(b)	Identify <b>two</b> sensors that the security system could use to detect intruders.						
		Describe how each sensor could be used in the security system.						
		Sensor 1						
		Description						
		Sensor 2						
		Description						
			[6]					

12	Explain the differences between <b>freeware</b> and <b>free software</b> .
	[4]

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