

## **Cambridge International Examinations**

Cambridge Ordinary Level

CANDIDATE NAME							
CENTRE NUMBER				CANDIDA NUMBER			



**COMPUTER SCIENCE** 

2210/12

Paper 1 Theory

October/November 2016

1 hour 45 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 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.



	Give <b>two</b> reasons why a programmer would choose		Jw-level laliguag
	1		
	2		
(b)	High-level languages require either an interpreter of	or a compiler to trans	late the program
(D)		•	. •
	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		
			<u> </u>
Sta	te <b>four</b> functions of an operating system.		
1			
1 2			
1 2 3			

3

(a)	Explain what is meant by:								
	(i)	Serial data transmission							
		[2]							
	(ii)	Parallel data transmission							
		[2]							
(b)		omputer in a factory is connected to a printer. The printer is located in an office 1 km away n the factory.							
	Ider	ntify which data transmission method would be most suitable for this connection.							
	Give	e two reasons for your choice.							
	1								
	2								
		[3]							
		اما							

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]

5	A computer	uses an	8-bit	register.
_	/ t collipator	acco an	0 010	10910101

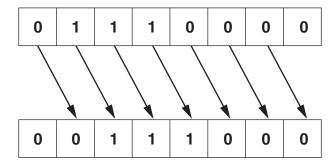
The 8-bit register contains binary integers.

(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.	
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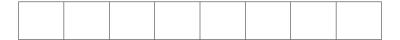
[1]
-----

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

·	
	. 1 /

(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.

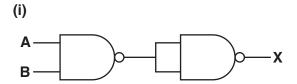
\_\_\_\_\_[1

(e)	Describe the problems that could be caused if the original binary number in <b>part (a)</b> is shifted <b>five</b> places to the <b>right</b> .							
		[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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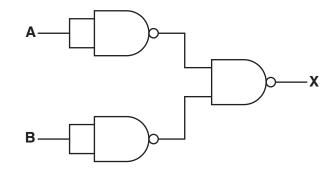
7 (a) Complete the truth tables and name the single logic gate that could replace each logic circuit:



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

Single logic gate .....[3]

(ii)

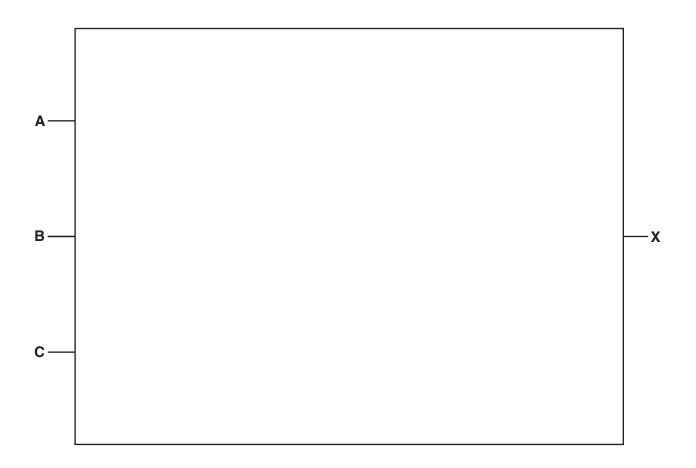


A	В	Working space	x
0	0		
0	1		
1	0		
1	1		

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	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]

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

the	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> s	ensors	that the	e secur	ity syst	em cou	ld use	to dete	ct intru	ders.		
	Descri	be how	each s	ensor o	could be	e used	in the s	security	syster	n.			
	Sensor	r 1											
	Descri	otion											
	Sensor	r 2											
	Descri	otion											
													[6]
													ران

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

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