

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the May/June 2015 series**

### **0478 COMPUTER SCIENCE**

**0478/13**

Paper 1 (Written), maximum raw mark 75

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**1 (a) parallel**

any **one** from:

- 8 bits/1 byte/multiple bits sent at a time
- using many/multiple/8 wires/lines (1 mark)

**serial**

any **one** from:

- one bit sent at a time
- over a single wire (1 mark) [2]

**(b) parallel**

- faster rate of data transmission (1 mark)

**serial**

any **one** from:

- more accurate/fewer errors over a longer distance
- less expensive wiring
- less chance of data being skewed/out of synchronisation/order (1 mark) [2]

**(c) parallel**

any **one** from:

- sending data from a computer to a printer
- internal data transfer (buses) (1 mark)

**serial**

- connect computer to a modem (1 mark) [2]

- 2 (a) – universal serial bus  
 – description of USB [1]

(b) Any **two** from:

- devices are automatically detected and configured when initially attached
- impossible to connect device incorrectly/connector only fits one way
- has become the industry standard
- supports multiple data transmission speeds
- lots of support base for USB software developers
- supported by many operating systems
- backward compatible
- faster transmission compared to wireless [2]

3 (a)

A	B	C	Working	X
0	0	0		1
0	0	1		0
0	1	0		0
0	1	1		0
1	0	0		0
1	0	1		1
1	1	0		1
1	1	1		1

] 1 mark

] 1 mark

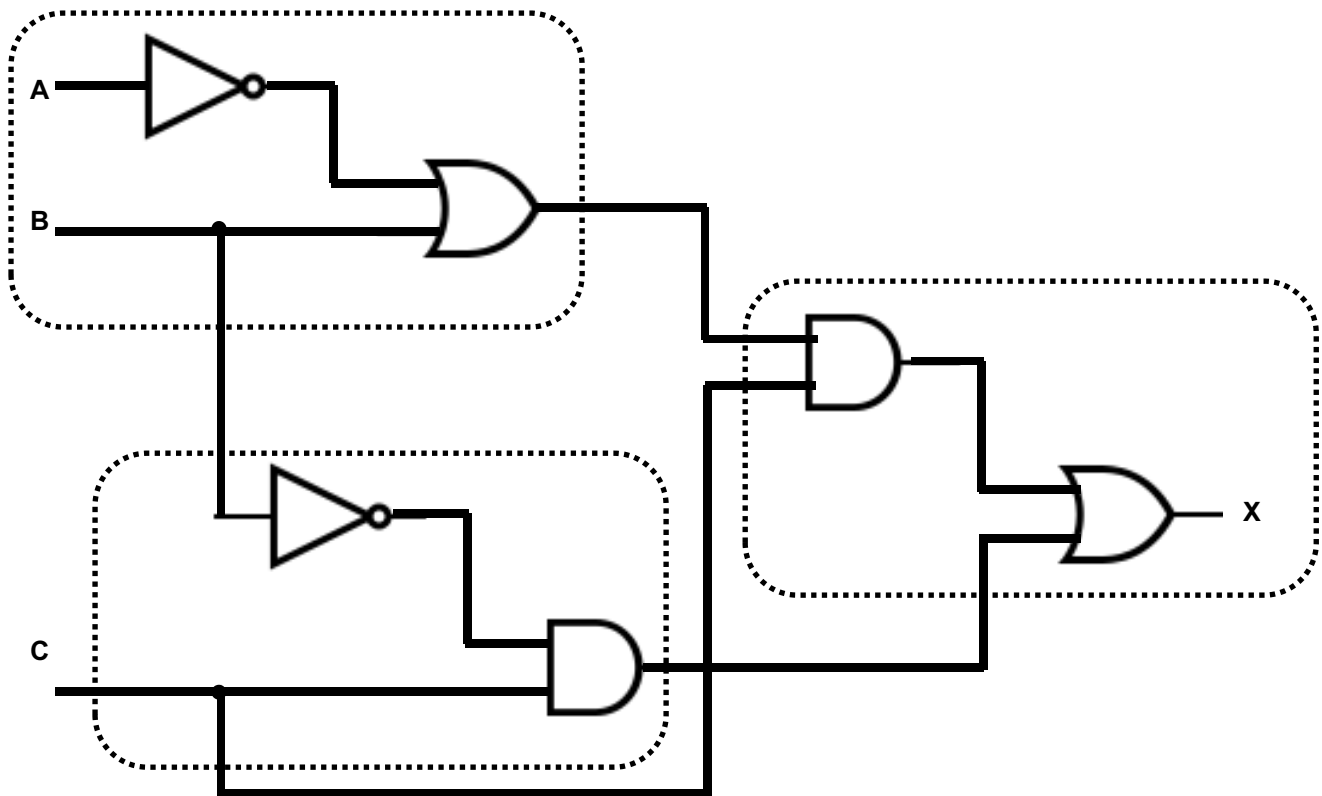
] 1 mark

] 1 mark

[4]

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(b) 1 mark per dotted section



[3]

(c) X is 1 if:

(A is 1 OR B is 1)

(1 mark)

AND

(1 mark)

(B is 1 OR C is NOT 1)

(1 mark)

accept equivalent ways of writing this:

e.g.  $(A \text{ OR } B = 1) \text{ AND } (B \text{ OR NOT } C = 1)$

e.g.  $(A \text{ OR } B) \text{ AND } (B \text{ OR NOT } C)$

e.g.  $(A + B) (B + \bar{C})$

[3]

4 1 mark per correct word

1 protocol

2 web server name

3 file name

accept these three items in any order

HTML tags/text

firewall

proxy server

[6]

5 1 mark per device, 1 mark per category

Description of storage device	Name of storage device	Category of storage		
		Primary	Secondary	Off-line
optical media which uses one spiral track; red lasers are used to read and write data on the media surface; makes use of dual-layering technology to increase the storage capacity	<b>DVD</b>			✓
non-volatile memory chip; contents of the chip cannot be altered; it is often used to store the start-up routines in a computer (e.g. the BIOS)	<b>ROM</b>	✓		
optical media which uses concentric tracks to store the data; this allows read and write operations to be carried out at the same time	<b>DVD-RAM</b>	✓		(✓)
non-volatile memory device that uses NAND flash memories (which consist of millions of transistors wired in series on single circuit boards)	<b>Solid State Drive/memory (SSD)</b>		✓	
	<b>(SD/XD card) (USB storage device)</b>			(✓)
optical media that uses blue laser technology to read and write data on the media surface; it uses a single 1.1 mm polycarbonate disc	<b>Blue-ray</b>			✓

[10]

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**6 (a) virus**

any **two** from:

- program/software that replicates/copies itself
- can delete or alter files/data stored on a computer
- can make the computer “crash”/run slow

**pharming**

any **two** from:

- malicious code/software installed on a user’s hard drive/actual web server
- this code redirects user to a fake website (without their knowledge)
- to obtain personal/financial information/data

**phishing**

any **two** from:

- legitimate-looking emails sent to a user
- as soon as recipient opens/clicks on link in the email/attachment ...
- ... the user is directed to a fake website (without their knowledge)
- To obtain personal/financial information/data

[6]

**(b) (i) Any two** from:

- spyware/key logging software can only pick up key presses
- using mouse/touchscreen means no key presses to log
- the numbers on the key pad are in random/non-standard format, which makes it more difficult to interpret

[2]

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(ii) 1 mark for name and 1 mark for description

any **one** from:

chip and PIN reader

- only the user and the bank know which codes can be generated

request user name

- additional security together with password/PIN

anti-virus

- removes/warns of a potential virus threat which can't be passed on to customers

firewall

- (helps) to protect bank computers from virus threats and hacking

encryption

- protects customer data by making any hacked information unreadable

security protocol

- governs the secure transmission of data

Biometric

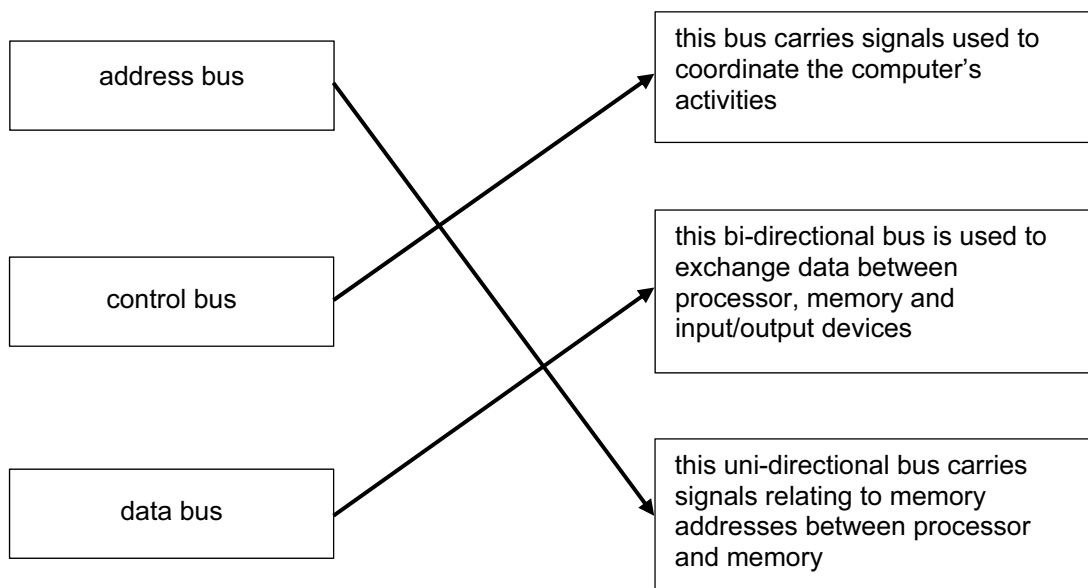
- to recognise user through the use of, e.g. facial/retina/finger print

Alerts

- users IP/MAC address is registered and user is alerted through, e.g. SMS if account is accessed through an unregistered address

[2]

7 (a)



2/3 matches – 2 marks

1 match – 1 mark

[2]

(b)

description of stage	sequence number
the instruction is then copied from the memory location contained in the MAR (memory address register) and is placed in the MDR (memory data register)	3
the instruction is finally decoded and is then executed	7
<i>the PC (program counter) contains the address of the next instruction to be fetched</i>	(1)
the entire instruction is then copied from the MDR (memory data register) and placed in the CIR (current instruction register)	4
the address contained in the PC (program counter) is copied to the MAR (memory address register) via the address bus	2
the address part of the instruction is placed in the MAR (memory address register)	6
the value in the PC (program counter) is then incremented so that it points to the next instruction to be fetched	5*

The incrementation of the program counter can appear at any stage after 2. All other stages must be in the correct given order.

[6]

8 (a) hours: 18

minutes: 53

[2]

(b)

hours ("C")

minutes ("D")

0	0	0	0	0	1	1	1	:	0	0	0	1	1	1	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

[2]



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(c) Any **three** from:

- reads values in registers “C” and “D”
- and checks the values against those stored in registers “A” and “B”  
(**NOTE:** the first two statements can be interchanged, i.e. “A” and “B” read first)
- If values in corresponding registers are the same
- the microprocessor sends a signal to sound alarm/ring [3]

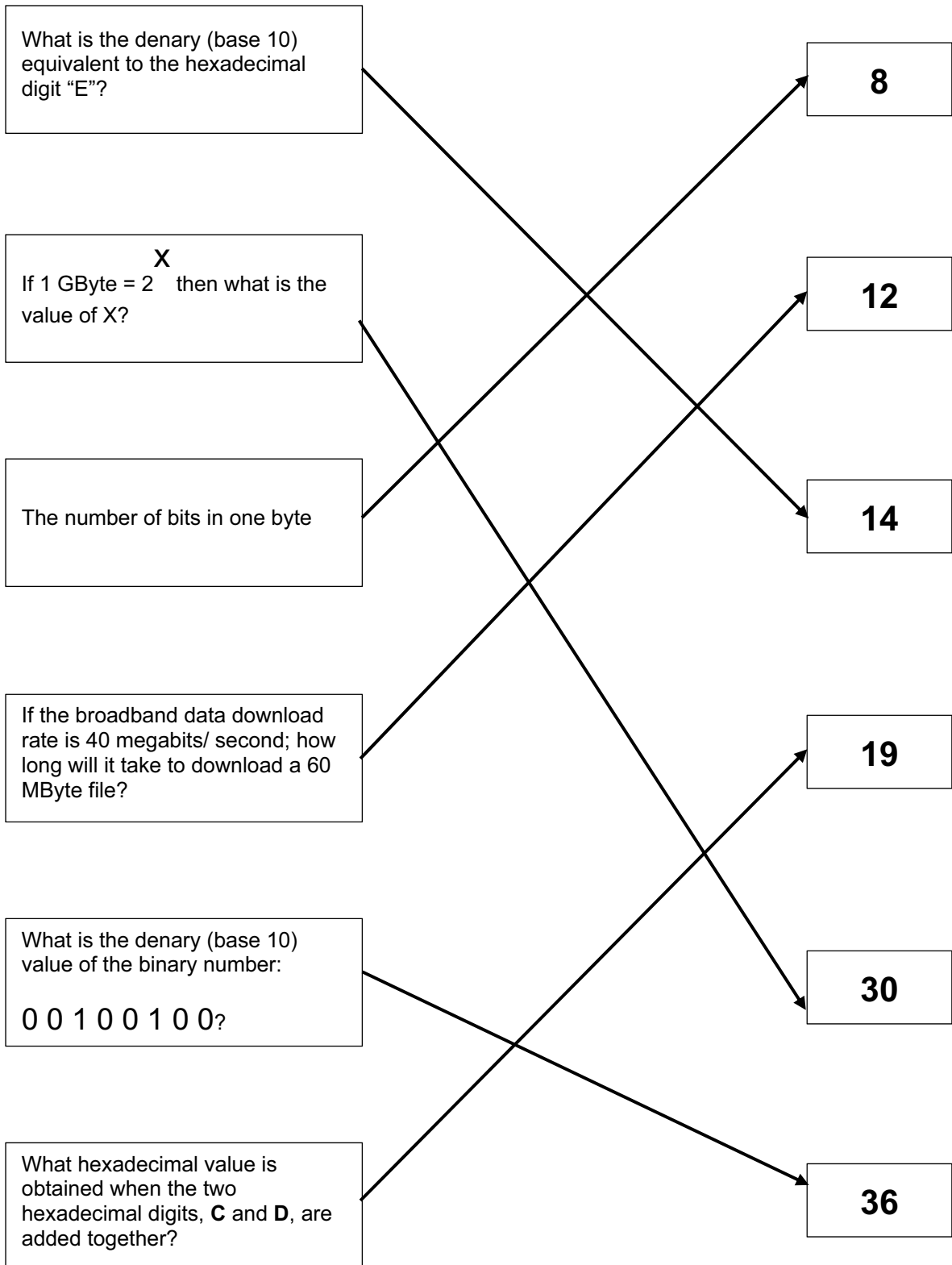
(d) Any **three** from:

- uses a light sensor
- sends signal/data back to microprocessor
- signal/data converted to digital (using ADC)
- value compared by microprocessor with pre-set/stored value
- if value < stored value, signal sent by microprocessor ...
- ... to the voltage supply (unit)
- ... “value” of signal determines voltage supplied/brightness of LED [3]

(e) Any **two** from:

- no need to warm up
- whiter tint/more vivid colours/brighter image
- higher resolution
- much thinner monitors possible/lighter weight
- more reliable technology/longer lasting
- uses much less power/more efficient [2]

9



5/6 matches – 5 marks  
 4 matches – 4 marks  
 3 matches – 3 marks  
 2 matches – 2 marks  
 1 match – 1 mark

[5]

10 1 mark per correctly placed tick

<b>statement</b>	<b>interpreter</b>	<b>compiler</b>
takes one statement at a time and executes it	✓	
generates an error report at the end of translation of the whole program		✓
stops the translation process as soon as the first error is encountered	✓	
slow speed of execution of program loops	✓	
translates the entire program in one go		✓

[5]