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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]

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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]

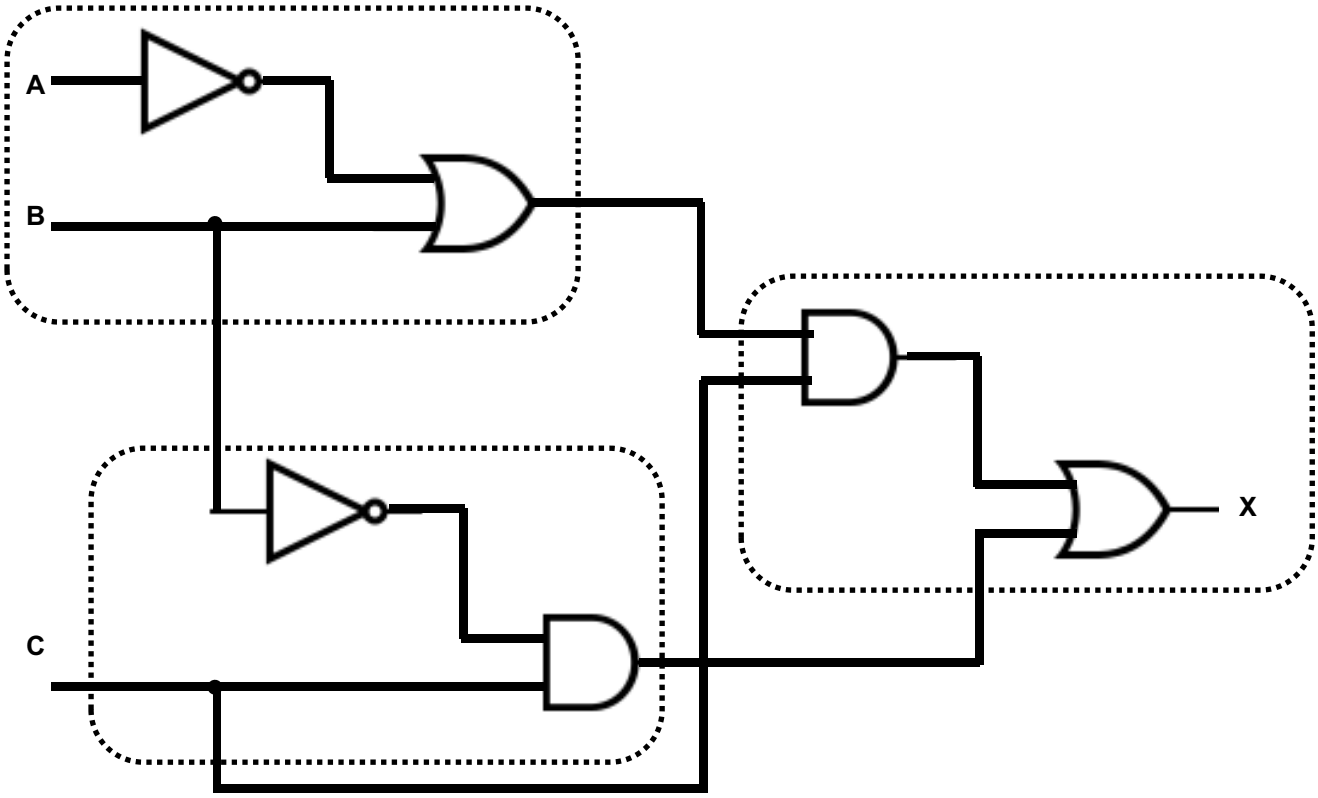
3 (a)

A	B	C	Working	X	
0	0	0		1	] 1 mark
0	0	1		0	
0	1	0		0	] 1 mark
0	1	1		0	
1	0	0		0	] 1 mark
1	0	1		1	
1	1	0		1	] 1 mark
1	1	1		1	

[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 OR B = 1) AND (B OR NOT C = 1)

e.g. (A OR B) AND (B OR NOT C)

e.g. $(A + B)\ (B + \overline{C})$ [3]

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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	**DVD**			✓
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)	**ROM**	✓		
optical media which uses concentric tracks to store the data; this allows read and write operations to be carried out at the same time	**DVD-RAM**	✓		**(✓)**
non-volatile memory device that uses NAND flash memories (which consist of millions of transistors wired in series on single circuit boards)	**Solid State Drive/memory (SSD)**		✓	
	(SD/XD card) (USB storage device)			**(✓)**
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	**Blue-ray**			✓

[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

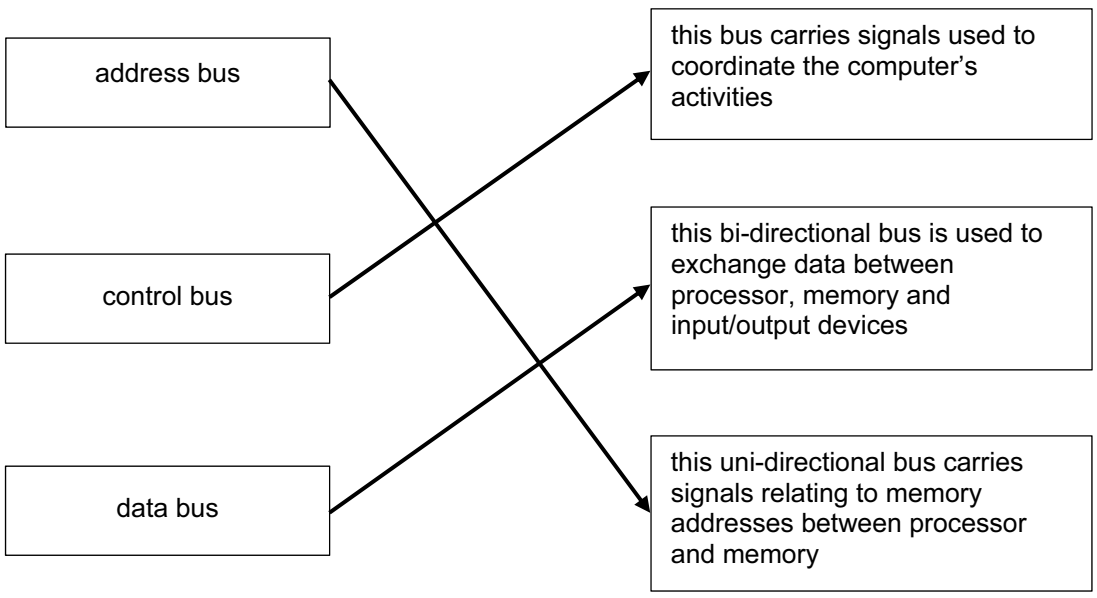
security protocol
– governs the secure transmission of data

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]

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(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**
the PC (program counter) contains the address of the next instruction to be fetched	*(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

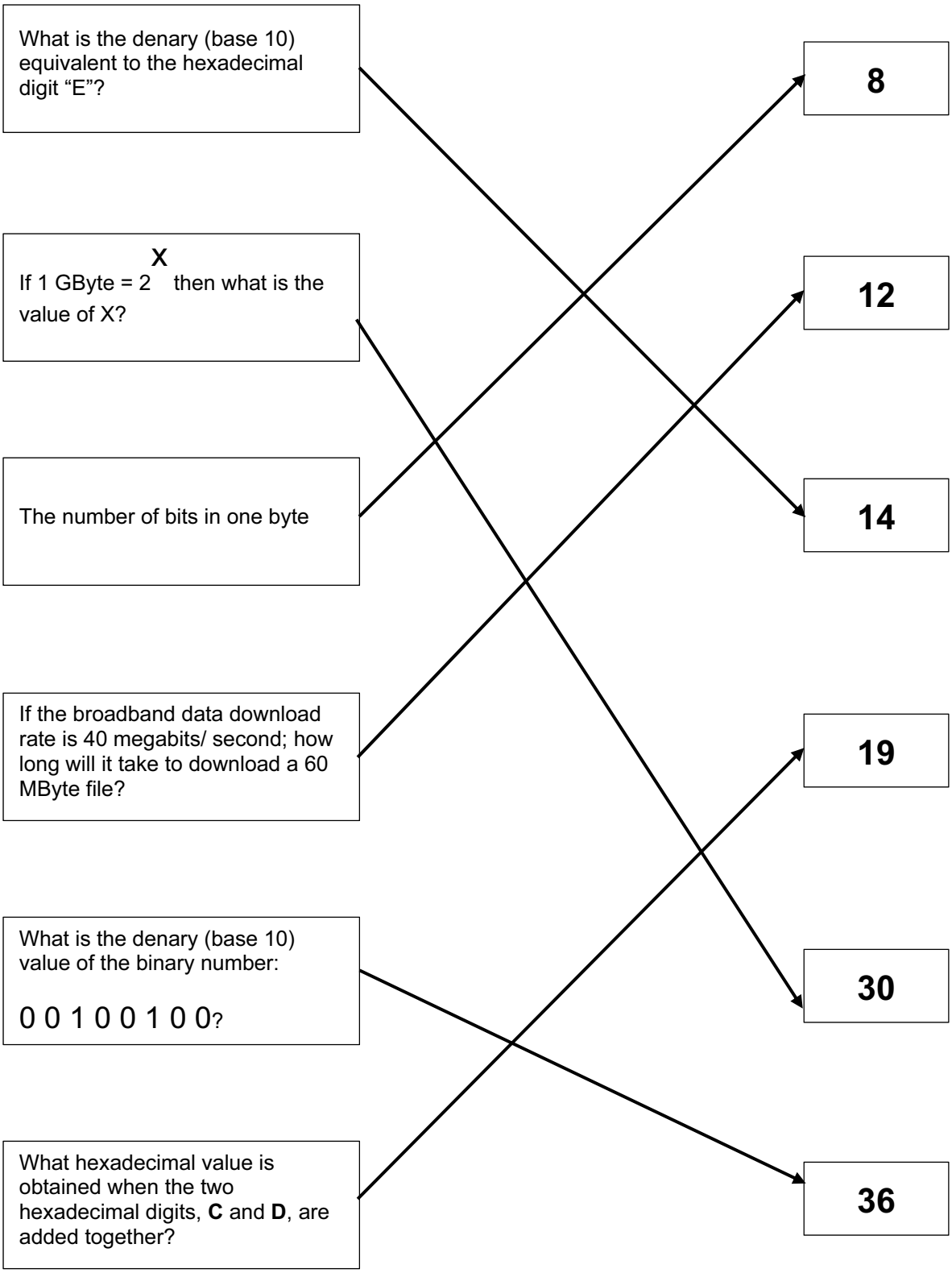
– much thinner monitors possible/lighter weight

– more reliable technology/longer lasting

– uses much less power/more efficient [2]

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9



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

[5]

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10 1 mark per correctly placed tick

statement	interpreter	compiler
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]

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