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Cambridge International General Certificate of Secondary Education

COMPUTER SCIENCE **0478/13**

Paper 1 **May/June 2016**

MARK SCHEME

Maximum Mark: 75

Published

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1 **1** mark for each correct column

Software feature	Free	Freeware	Shareware
Software source code can be freely accessed and modified as required	✓		
All the features of the full version of the software are not made available; the full version needs to be purchased first			✓
The original software is subject to all of the copyright laws		✓	✓
It is possible to distribute modified versions or copies of the software to friends and family	✓		
	(1 mark)	(1 mark)	(1 mark)

[3]

2 **(a)** **media access control** [1]

(b) Any **three** from:

- hardware/physical address
- unique address/number associated (with network card in) a device/computer
- usually 48/64 bits (12/16 hex digits)
- first 6/8 digits = manufacturer code/ID of device (NIC)
- last 6/8 digits = serial number of device (NIC) [3]

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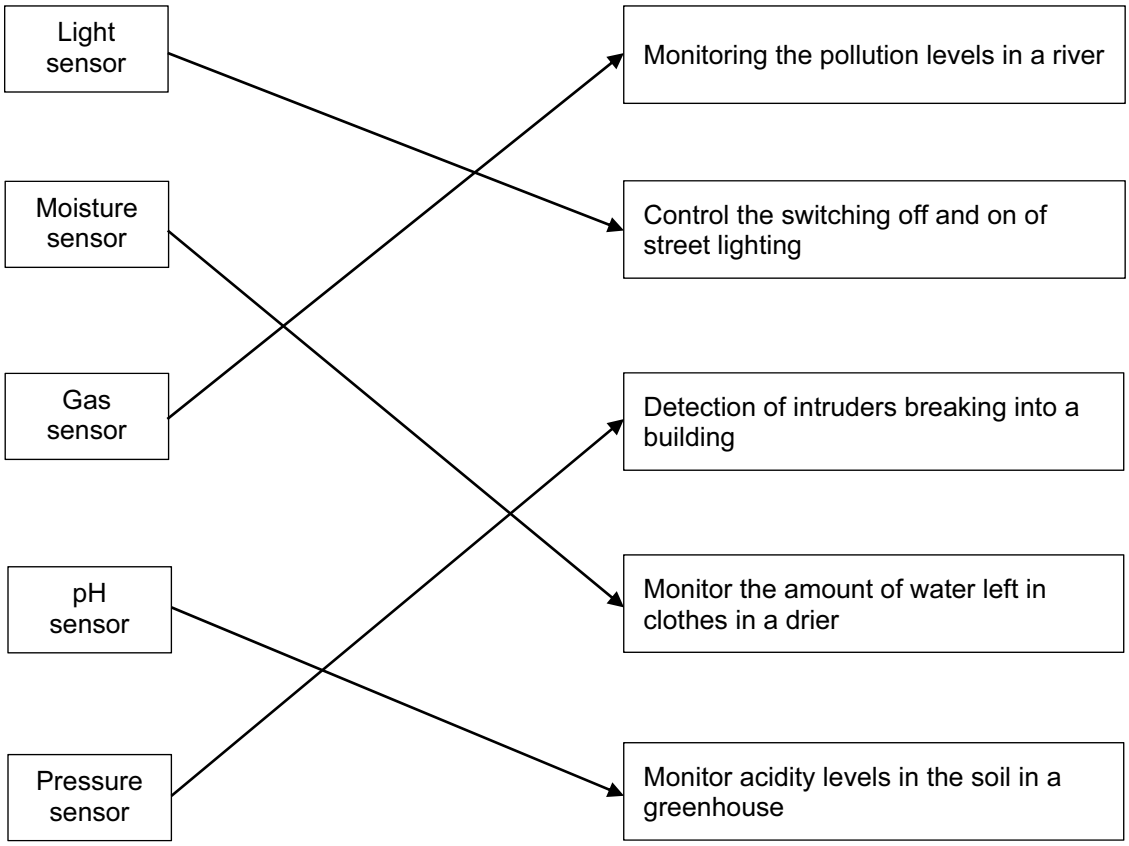
3 (a)



4/5 matches – 4 marks
3 matches – 3 marks
2 matches – 2 marks
1 match – 1 mark [4]

(b) Any **four** from:

- sensor(s) sends signal/data to microprocessor
- signal/data converted to digital (using an ADC)
- microprocessor compares signal/data with pre-set/stored value
- if sensor(s) signal/data indicates the presence of a person / the door needs to be opened / a match is found / door is closed …
- … microprocessor sends a signal to an actuator …
- … to operate/drive a motor to open the door [4]

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4 (a) (i) serial [1]

(ii) Any **three** from:
- automatically detects the hardware/installs drivers
- plug only goes in one way/can't connect incorrectly
- supports different data transmission speeds/a range of data transmission speeds
- has become the industry standard/universally used
- backwards compatible (with earlier versions of USB ports) [3]

(iii) interrupt [1]

(b) **1** mark each use of printer, max 1 mark per printer.

inkjet printer	– (small quantities of) documents – photographs
3D printer	– (physical) prototype (from CAD) – (physical) model (from a blueprint) [2]

(c) **1** mark for naming printer + **1** mark for description + **1** mark for application

Laser printer

- uses toner/powder ink
- uses (positive and negative) charged drums // rotating drum
- uses static charge
- no moving head
- faster at printing
- high volume output/high speed
- producing flyers/leaflets/magazines [3]

This is an example, other types of printers can be credited.

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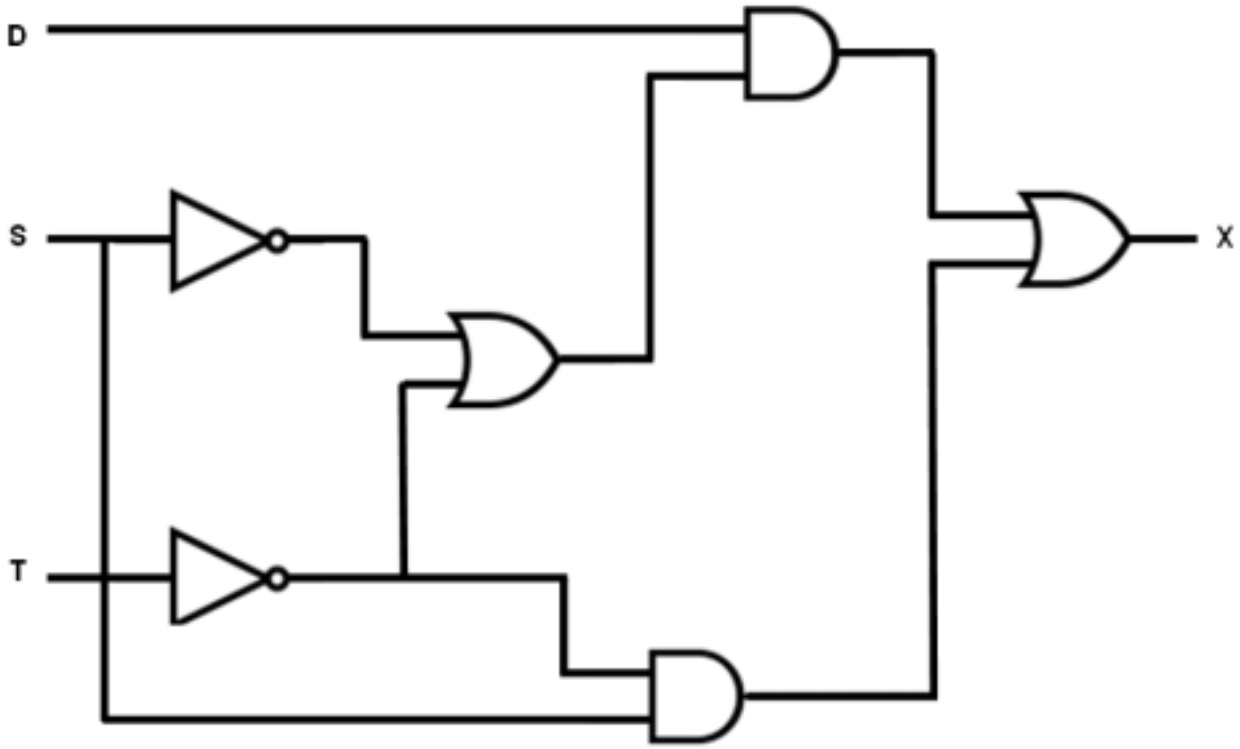
5 (a) **1** mark for each correct gate, with correct source of input(s)



[6]

(b)

D	S	T	Working Space	X
0	*0*	*0*		**0**
0	*0*	*1*		**0**
0	*1*	*0*		**1**
0	*1*	*1*		**0**
1	*0*	*0*		**1**
1	*0*	*1*		**1**
1	*1*	*0*		**1**
1	*1*	*1*		**0**

4 marks for 8 correct X bits
3 marks for 6 correct X bits
2 marks for 4 correct X bits
1 mark for 2 correct X bits [4]

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6 **(a)** Any **one** from:

- protocol ends in "s"
- use of http**s** [1]

(b) Any **three** from:

- requests web server to identify itself/view the (SSL) certificate
- receives a copy of the (SSL) certificate, sent from the webserver
- checks if SSL certificate is authentic/trustworthy
- sends signal back to webserver that the certificate is authentic/trustworthy
- starts to transmit data once connection is established as secure
- if website is not secure browser will display an open padlock/warning message [3]

7 **(a)** **1** mark for each correct binary value

3	**0**	**0**	**1**	**1**
5	**0**	**1**	**0**	**1**

[2]

(b)

0	**0**	**0**	**1**	→ **1**
1	**0**	**0**	**1**	→ **9**
0	**1**	**0**	**0**	→ **4**
1	**1**	**1**	**0**	→ **E**

1 mark

1 mark

[2]

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8 (a) (i) Any **two** from:

- to protect against key logging software/spyware
- can stop key presses being recorded
- can stop key presses being relayed
- drop down boxes cannot be recorded as key presses
- drop down boxes can be placed in different location on the screen each time (to overcome screen capture issues) [2]

(ii) Any **one** from:

- hacker never finds all characters on the first hack
- makes it more difficult for hackers to find the order of the characters
- hacker needs to hack the system several times to gain the whole password
- shoulder surfing will not give person full password [1]

(b) Any **two** from:

- fingerprint scanner
- face recognition software
- retina scanner/iris scanner
- voice recognition software [2]

9 (a) **1** mark for correct check digit and **1** mark for showing the calculation

$(4 \times 1) + (2 \times 2) + (4 \times 3) + (1 \times 4) + (5 \times 5) + (0 \times 6) + (8 \times 7)$

$= 4 + 4 + 12 + 4 + 25 + 0 + 56 = 105$

$105/11 = 9$ remainder 6

1 mark for any correct line of working

check digit is: **6** [2]

(b) **incorrect** check digit [1]

- check digit should be 1
- (3*1) + (2*2) + (4*3) + (0*4) + (0*5) + (4*6) + (5*7) // 3 + 4 + 12 + 0 + 0 + 24 + 35 // Total = 78
- 78/11 gives 7 remainder 1 [2]

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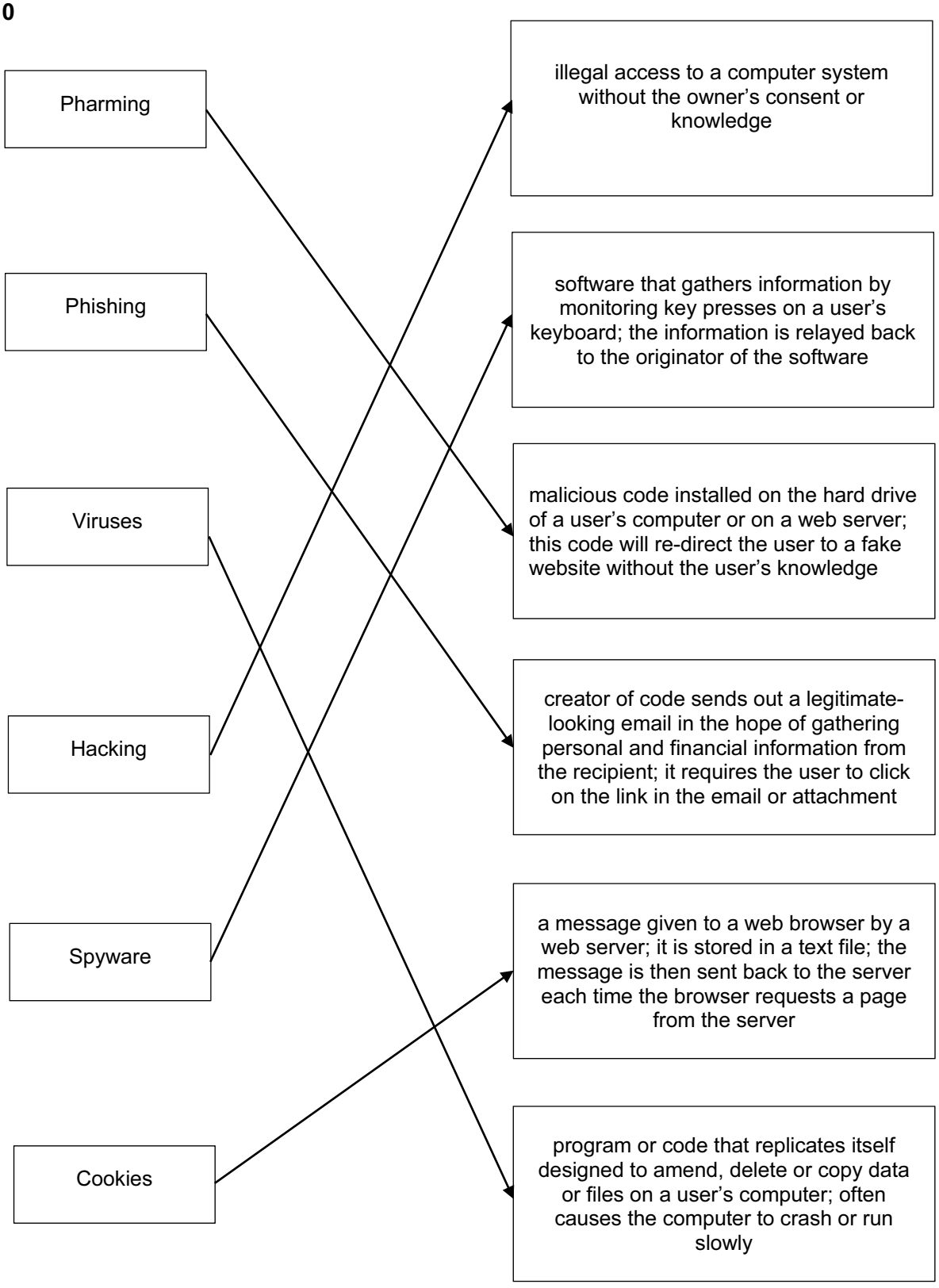
10



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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11 (a) **1** mark for each correct row

	Single track	Many concentric tracks	Blue laser used to read/ write data	Red laser used to read/ write data	
DVD-RW	✓			✓	1 mark
DVD-RAM		✓		✓	1 mark
CD-ROM	✓			✓	1 mark
Blu-ray disc	✓		✓		1 mark

[4]

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

- don't need to "get up to speed" to work properly/no latency
- lower/less power consumption/more energy efficient
- run cooler
- run quieter
- data access is faster
- occupies less physical space/more compact
- lighter, so more suitable for a portable computer/laptop
- no moving parts so more reliable/durable in a portable computer/laptop [3]

(ii) Any **two** from:

- HDD is cheaper for larger amounts of storage space
- HDD has greater longevity for read/write functions
- Expensive to change the technology // HDD are trusted technology
- No requirement for the increased speed of SSD [2]

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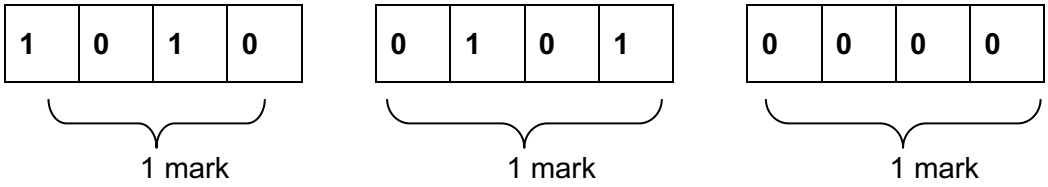
12 (a) QR (quick response) Code [1]

(b) – A 5 0 (1 mark)



[4]

(c) Any **three** from:

- visitor scans the QR code with (the camera on) the mobile device
- App is used to read/interpret the QR code
- links to a website/opens a document …
- … to access local tourist information
- can store the QR code to refer to again for the information [3]

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