COMPUTER SCIENCE	2210/11
Paper 1	**May/June 2016**
MARK SCHEME	
Maximum Mark: 75	

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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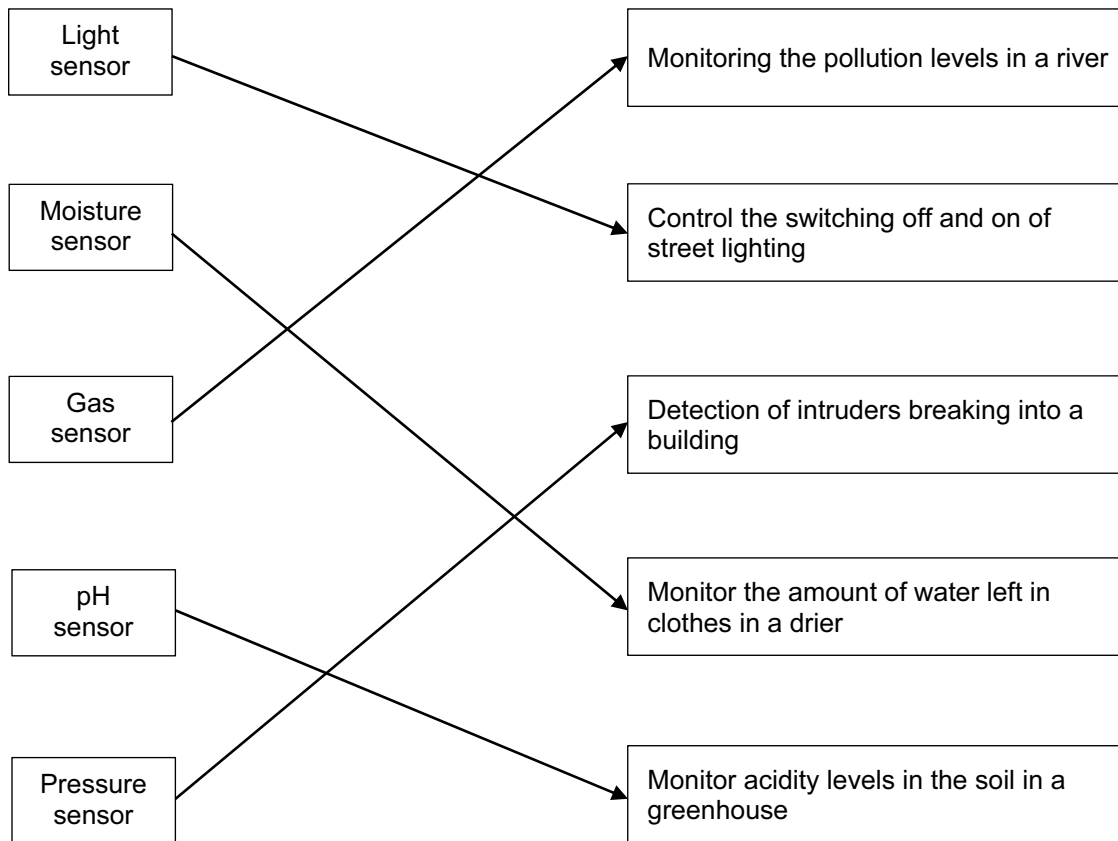
2 **(a)** **media access control** [1]

    (b) Any **three** from:

- hardware/physical address
- <u>unique</u> 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]

3 (a)

Light sensor	→	Monitoring the pollution levels in a river
Moisture sensor		Control the switching off and on of street lighting
Gas sensor		Detection of intruders breaking into a building
pH sensor		Monitor the amount of water left in clothes in a drier
Pressure sensor		Monitor acidity levels in the soil in a greenhouse

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 <u>signal/data</u> to microprocessor
– signal/data <u>converted to digital</u> (using an ADC)
– <u>microprocessor</u> 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 …
– … <u>microprocessor</u> sends a signal to an actuator …
– … to operate/drive a motor to open the door [4]

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
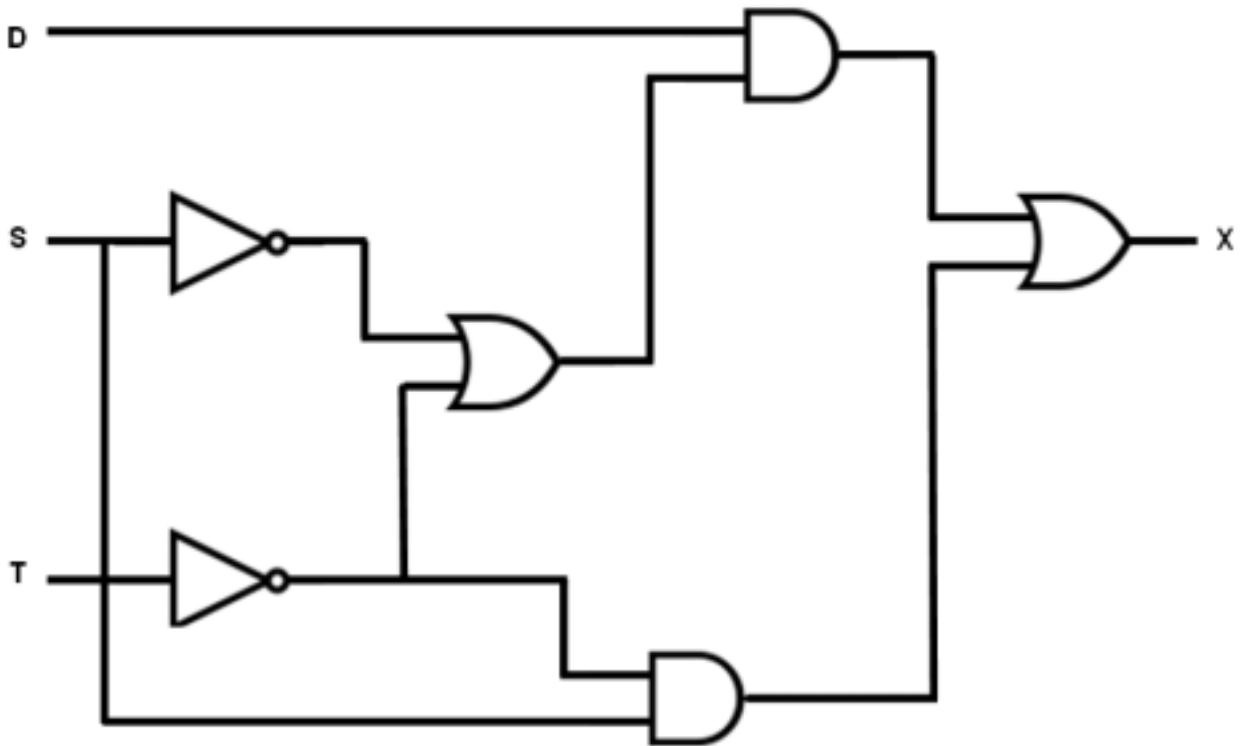
Laser printer

- – 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.

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]

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 ⎬ 1 mark
0	1	0	0	→ 4 ⎭
1	1	1	0	→ E ⎬ 1 mark

[2]

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

$(4 \times 1) + (2 \times 2) + (4 \times 3) + (1 \times 4) + (5 \times 5) + (0 \times 6) + (8 \times 7)$
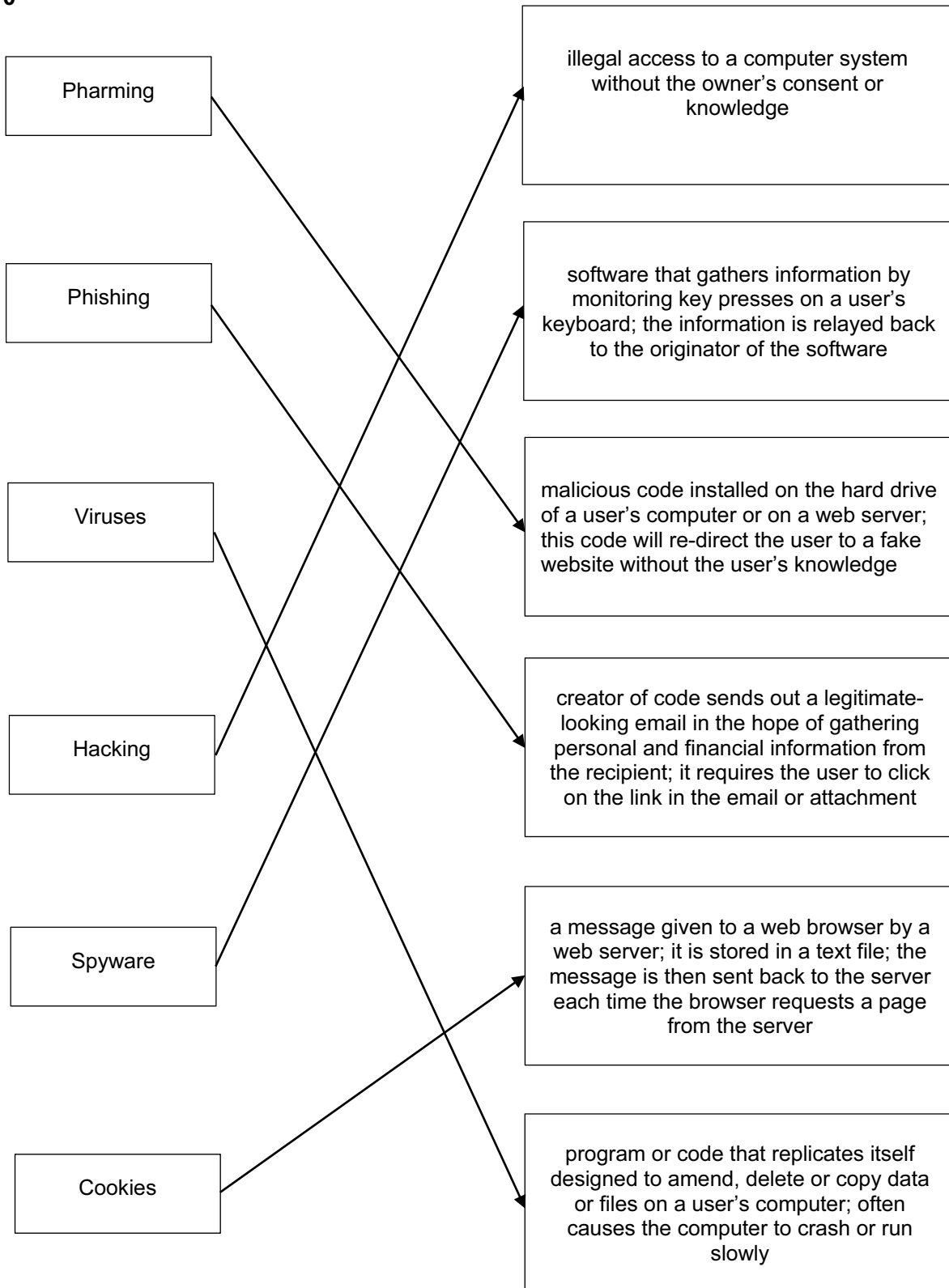
$= 4 + 4 + 12 + 4 + 25 + 0 + 56 = 105$

$105/11 = 9$ 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]

10

Pharming	illegal access to a computer system without the owner's consent or knowledge
Phishing	software that gathers information by monitoring key presses on a user's keyboard; the information is relayed back to the originator of the software
Viruses	malicious code installed on the hard drive of a user's computer or on a web server; this code will re-direct the user to a fake website without the user's knowledge
Hacking	creator of code sends out a legitimate-looking email in the hope of gathering personal and financial information from the recipient; it requires the user to click on the link in the email or attachment
Spyware	a message given to a web browser by a web server; it is stored in a text file; the message is then sent back to the server each time the browser requests a page from the server
Cookies	program or code that replicates itself designed to amend, delete or copy data or files on a user's computer; often causes the computer to crash or run slowly

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

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]

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

(b) – **A 5 0** (1 mark)

1	0	1	0

1 mark

0	1	0	1

1 mark

0	0	0	0

1 mark
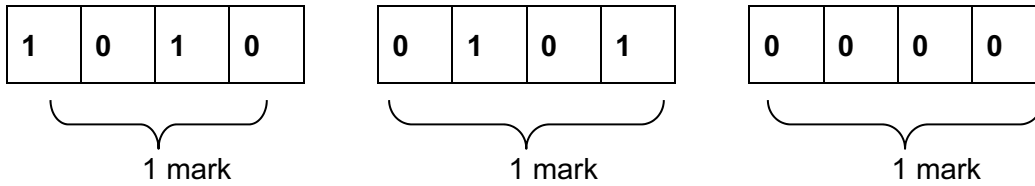
[4]

(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]