

QUESTION 1. Mark Scheme

Cambridge IGCSE – May/June 2015

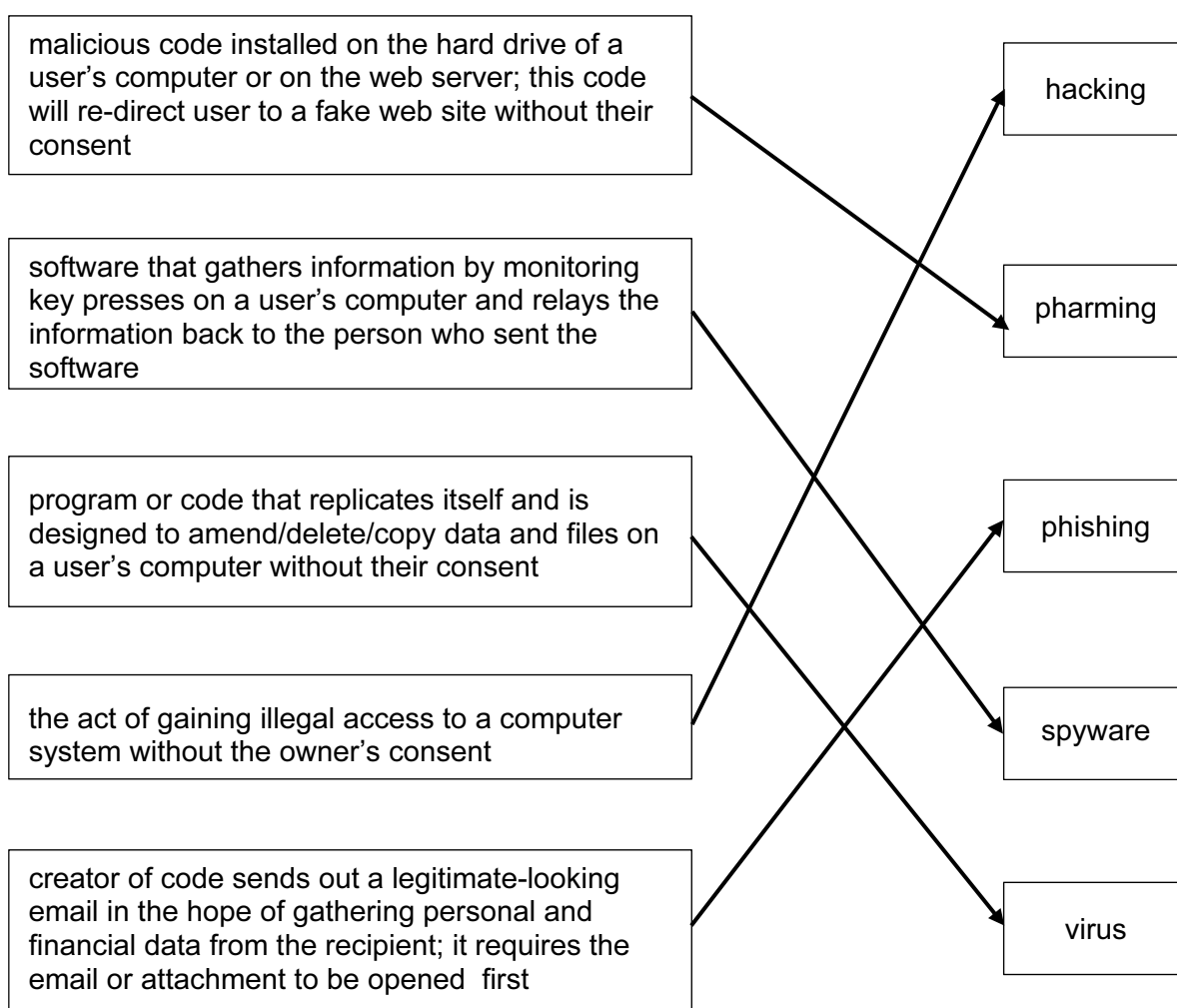


1 (a) 1 mark per correctly placed tick

Statement	True	False
they are a form of spyware		✓
they are used in advertising only		✓
they are used to track the browsing of a user	✓	
they act in the same way as a virus		✓

[4]

(b)



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

[4]



- 2 (i) Either of the three options, **resistive**, **capacitive** or **infra-red** must be chosen maximum of **two** marks from chosen technology:

resistive

- uses multiple layers of material ...
- ... that transmit electric currents
- when the top layer/screen is pushed/touched into the lower/bottom layer ...
- ... the electric current changes and location of “touch” is found

capacitive

- current sent/flows out from all 4 corners of the screen
- when finger/stylus touches screen, the current changes
- the location of “touch” is calculated

infra-red

- an “invisible” grid on the screen (pattern of infra-red LED beams)
- sensors detect where the screen has been touched through a break in an infrared beam(s)
- the position where the screen touched is calculated

[2]

- (ii) 1 mark for **benefit**, 1 mark for **drawback**

Resistive

benefits:

- inexpensive/cheap to manufacture
- can use stylus/finger/gloved finger/pen

drawbacks:

- poor visibility in sunlight
- vulnerable to scratching
- wears through time
- does not allow multi-touch facility

capacitive

benefits:

- good visibility in sunlight
- (very) durable surface
- allows multi-touch facility

drawbacks:

- screen (glass) will shatter/break/crack (on impact)
- cannot use when wearing (standard) gloves

infra-red

benefits:

- good durability
- allows multi-touch facility
- can use stylus/finger/gloved finger/pen

drawbacks:

- expensive to manufacture
- screen (glass) will shatter/break/crack (on impact)
- sensitive to dust/dirt

[2]

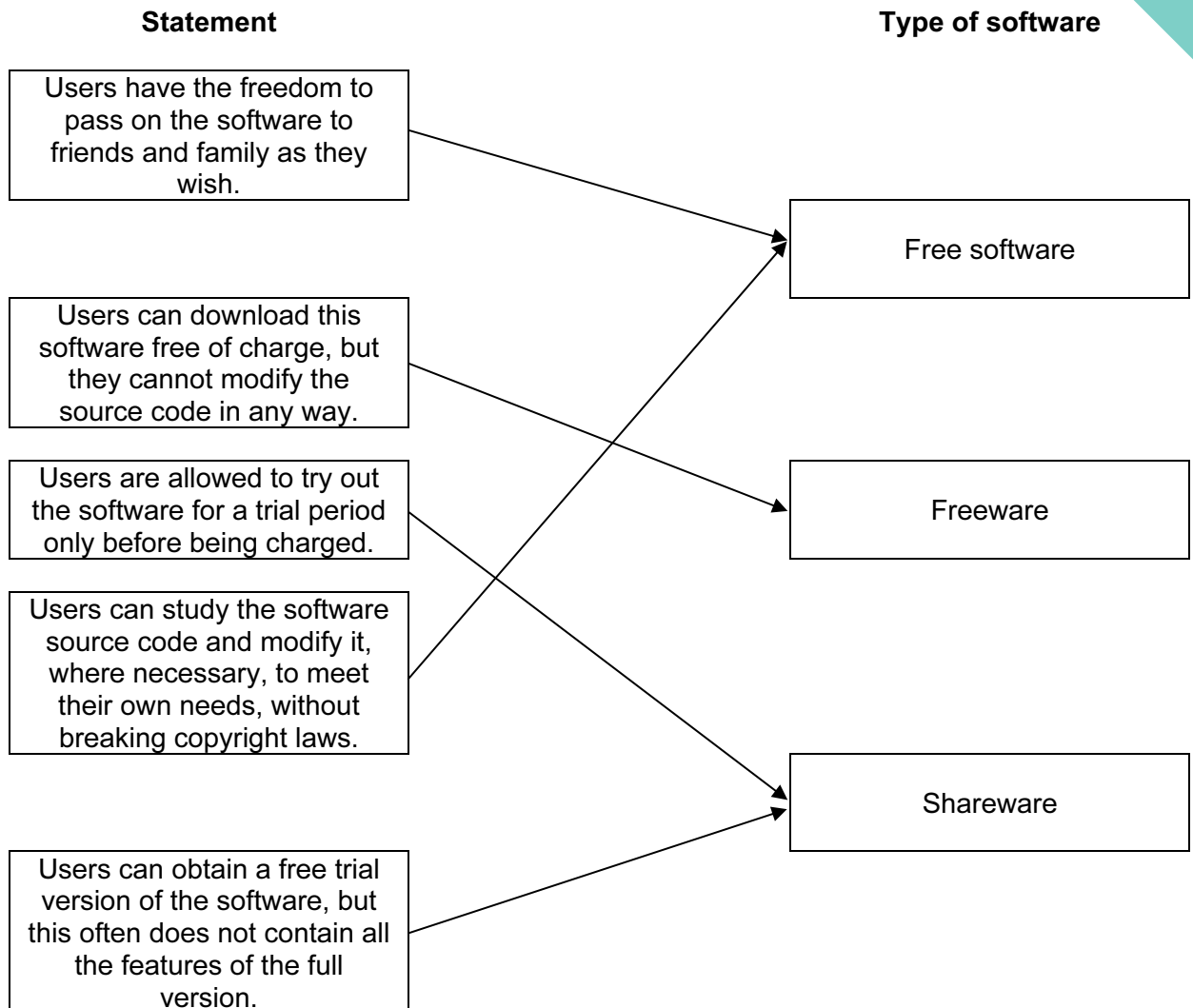
QUESTION 2.

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8 (a) 1 mark for correct lines from each type of software

NOTE: all statements that are correct must be connected to the correct type of software for the mark to be awarded



[3]

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(b) Any **three** from:

- That we should follow Copyright laws/intellectual property rights/work should not be stolen/plagiarised
- That we should follow Data Protection laws
- That we should not create or distribute malware//description of malware
- That we should not hack/crack other computers//description of hacking
- That we should protect our own computers against malware/hacking
- That we should consider privacy issues (when using social networking)
- That we consider anonymity issues (when using social networking)
- That we should consider environmental impacts when using computers
- Loss/creation of jobs from use of computers/robotics
- We should follow codes of practice (for creation of code e.g. ACM/IEEE)

[3]

(c) 2 marks for each term described

Viruses:

- program/software/file that replicates (copies) itself
- intends to delete or corrupt files//fill up hard disk space

Pharming:

- malicious code stored on a computer/web server
- redirects user to fake website to steal user data

Spyware:

- monitors and relays user activity e.g. key presses//key logging software
- user activity/key presses can be analysed to find sensitive data e.g. passwords

[6]

(d) Any **three** from:

- examines/monitors traffic to and from a user's computer and a network/Internet
- checks whether incoming and outgoing traffic meets a given set of criteria/rules
- firewall blocks/filters traffic that doesn't meet the criteria/rules
- logs all incoming and outgoing traffic
- can prevent viruses or hackers gaining access
- blocks/filters access to specified IP addresses/websites
- warns users of attempts by software (in their computer) trying to access external data sources (e.g. updating of software) etc. // warns of attempted unauthorised access to the system

[3]



9 (a)

Binary number A:

1	1	1	0	0	1	0
---	---	---	---	---	---	---

Binary number B:

1	0	0	1	1	1	0
---	---	---	---	---	---	---

[2]

(b)

Parity Bit

Binary number A

1

Binary number B

1

[2]

10 1 mark for each correct storage device

ROM (not EPROM/PROM)
Blu-ray disc
RAM
DVD/ DVD-R(+R)/ DVD-RW(+RW)/ DVD-ROM (not CD or DVD-RAM)
SSD/example of a USB <u>storage device</u>
DVD-RAM

[6]

11 1 mark for each correct point

- Presentation is used to format colour/style
- Structure is used to create layout
- In a HTML document structure and presentation are often kept separate
- By keeping the presentation separate it is easier to update colour/font
- Presentation is often stored in a file called a CSS ...
- ... the CSS is then linked to the HTML document to implement the presentation requirements
- (Mark-up) tags are used to define the structure of the document ...
- ... presentation and formatting can also be included within the tags

[4]

QUESTION 3.

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- 1 1 mark for each risk + 1 mark for corresponding reason why it is a risk and 1 mark for minimisation

Risk: hacking

Reason: illegal/unauthorised access to data
deletion/amendment of data

Minimised: use of passwords/user ids
use of firewalls
encrypt data/encryption

Risk: virus

Reason: can corrupt/delete data
cause computer to crash/run slow
can fill up hard drive with data

Minimised: use of /run anti-virus (software)
do not download software or data from unknown sources

Risk: spyware/key logging (software)

Reason: can read key presses/files/monitors on a user's computer

Minimised: use of /run anti-spyware (software)
use data entry methods such as drop-down boxes to minimise risk

Risk: phishing

Reason: link/attachments takes user to fake/bogus website
website obtains personal/financial data

Minimised: do not open/click emails/attachments from unknown sources
some firewalls can detect fake/bogus websites

Risk: pharming

Reason: redirects user to fake/bogus website
redirection obtains personal/financial data

Minimised: only trust secure websites, e.g. look for https
check the URL matches the intended site

Risk: credit card fraud/identity theft

Reason: loss of money due to misuse of card/stealing data

Minimised: set passwords
encrypt data/encryption

Risk: cracking

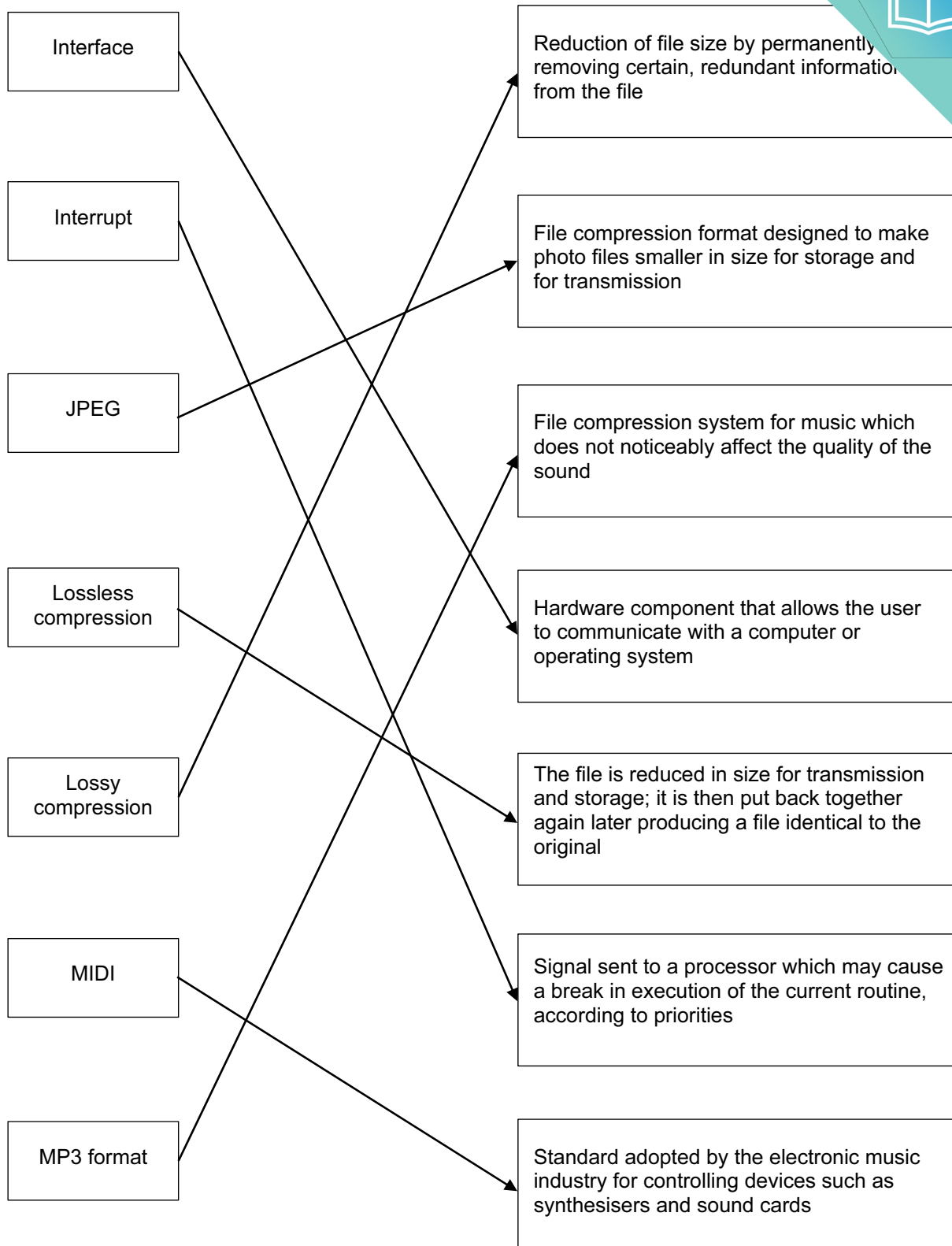
Reason: illegal/unauthorised access to data

Minimised: setting strong passwords
encrypt data/encryption

There may be other valid answers given that are outside the provided mark scheme.

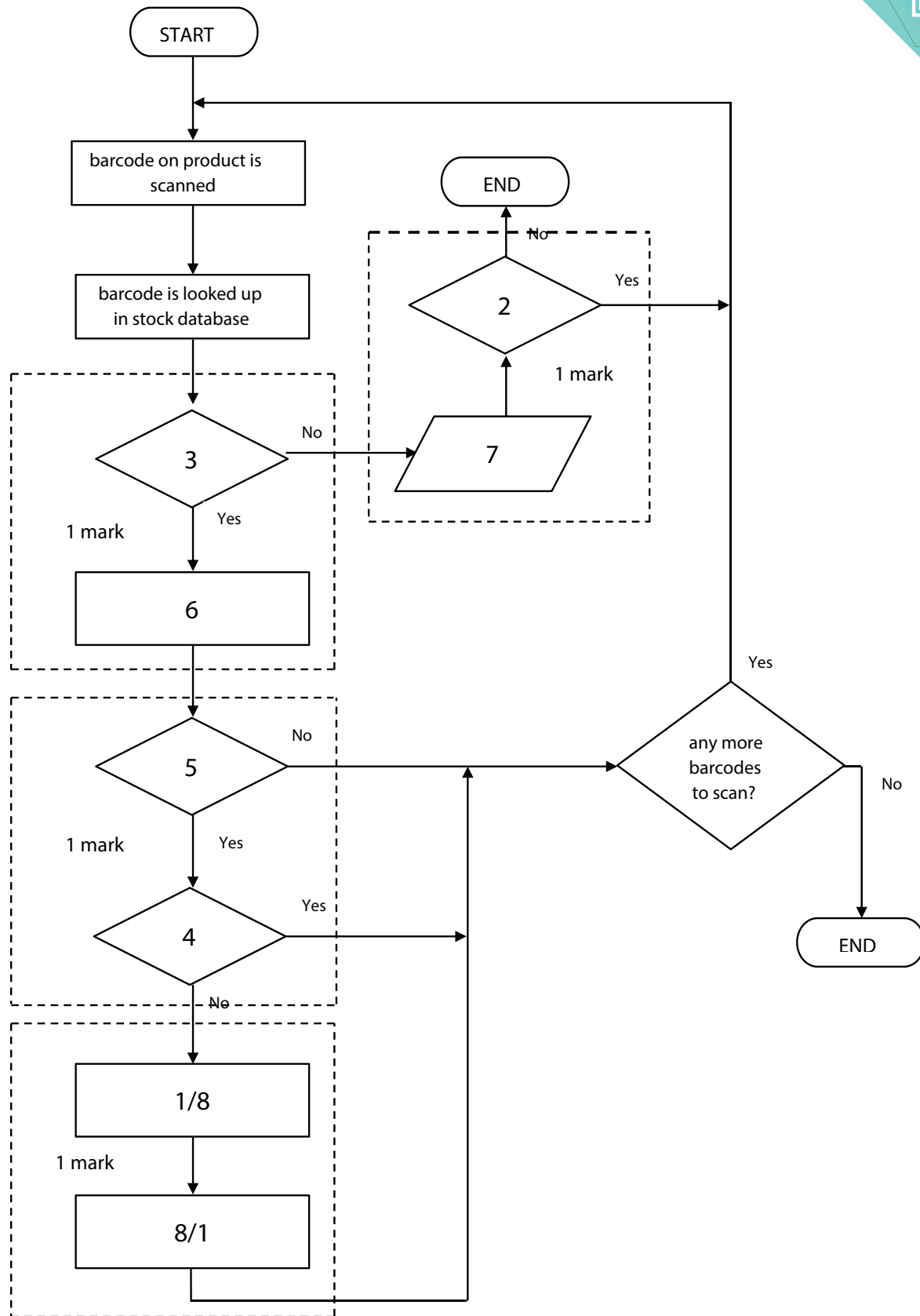


2





3





- 4 (a) (i) For each hex number, 2 marks if all correct, 1 mark for 2 correct conversions

F A 7:

1	1	1	1		1	0	1	0		0	1	1	1
---	---	---	---	--	---	---	---	---	--	---	---	---	---

D 3 E:

1	1	0	1		0	0	1	1		1	1	1	0
---	---	---	---	--	---	---	---	---	--	---	---	---	---

[4]

- (ii) 2 marks if all correct, 1 mark for 2 correct conversions – Follow through

1	1	0	1		0	0	1	0		0	1	1	0
---	---	---	---	--	---	---	---	---	--	---	---	---	---

[2]

- (iii) 2 marks if all correct, 1 mark for 2 correct conversions – Follow through
D 2 6

[2]

(b) (i) (X) FF FF 00

(Y) FF 00 FF

(Z) 00 FF FF

[3]

- (ii) – hex values between 0 to F are combined together to create a hex code
– different combinations in hex codes will create different shades/tones/colours

[2]

(c) (i) First six digits: manufacturer code/manufacturer ID

Last six digits: serial number/serial ID of device/product

[2]

(ii) Allows all devices to be uniquely identified

[1]

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- 5 (a) Any **five** from:
- naming a suitable sensor, e.g infra-red, pressure, motion sensors, send signal to microprocessor
 - signal/data is converted to digital (using an ADC)
 - microprocessor instructs/send signals to camera to capture image/video
 - captured image/video data sent to microprocessor
- either**
- microprocessor compares the image/video with stored images/video...
 - ... if person detected = stored image ...
 - ...alert given to signal a person has been identified
- or**
- microprocessor compares the biometric data from an image/video with stored biometric data for images/video ...
 - ... if biometric data matched = stored data ...
 - ... alert given to signal a person has been identified
- Continual/repeated process [5]
- (b) 1 mark for correct calculation, 1 mark for correct answer
- number of photos = $12 \times 60 \times 24 = 17\,280$
 - memory requirement = $17\,280/1024 = 16.9$ (**16.875**)
 - ($17\,280/1000 = 17.28/17.3$ is acceptable) [2]
- (c) Any **two** from:
- (data transmission) is faster
 - more secure/safer (because it is a dedicated line)
 - (fibre optic transmission) is more reliable [2]

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- 6 (a) Any **three** from:
- hypertext mark-up language
 - used to create/develop/author webpages
 - translated by a browser to display webpages
 - uses (opening and closing) tags to display/format content

- (b) **Structure:**
- instructs how the layout of the content is displayed

Presentation:

- instructs how the content will be formatted e.g. colour/style/CSS [2]

- (c) Any **three** from:
- displays web page
 - interprets/translate the HTML document
 - interprets/translate embedded scripting, for example JavaScript
 - provides functions, such as bookmarks and history
 - identifies protocols, such as https, SSL [3]

- 7 (a) (i) 1 mark for correct check digit and 1 mark for showing the calculation

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

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

$$105/11 = 9 \text{ remainder } 6$$

check digit is: 6 [2]

- (ii) **1 mark**

- No/incorrect check digit

2 marks

- Total is 78
- 78/11 ...
- ... gives 7 remainder 1
- check digit should be 1 [3]



(b) (i) 1 mark for each correct parity bit

parity bit

0	1	1	0	0	1	1	0
---	---	---	---	---	---	---	---

parity bit

1	0	0	0	0	0	0	1
---	---	---	---	---	---	---	---

[2]

(ii) Any **one** from:

- an even number of digits are changed
- a transposition error(s) has occurred

[1]

8 1 mark for each step in correct order. (NOTE: Marks can be awarded for a correct sequence.)

Steps in the printing process	Step order
As the printing drum rotates, a laser scans across it; this removes the positive charge in certain areas	4
The printing drum is coated in positively-charged toner; this then sticks to the negatively-charged parts of the printing drum	6
The paper goes through a fuser which melts the toner so it fixes permanently to the paper	9
The printer driver ensures that the data is in a format that the laser printer can understand	(1)
A negatively-charged sheet of paper is then rolled over the printing drum	7
Data is then sent to the laser printer and stored temporarily in the printer buffer	2
The toner on the printing drum is now transferred to the paper to reproduce the required text and images	8
The printing drum is given a positive charge	3
Negatively-charged areas are then produced on the printing drum; these match exactly with the text and images to be printed	5

[8]

QUESTION 4. Mark Scheme

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(ii)

MAR	1	0	0	0	1	1	1	0
-----	---	---	---	---	---	---	---	---

MDR	0	1	1	1	1	0	0	1
-----	---	---	---	---	---	---	---	---

[2]

(iii)

Address	Contents
1000 0000	0110 1110
1000 0001	0101 0001
1000 0010	1000 1101
1000 0011	1000 1100
1000 1100	
1000 1101	
1000 1110	0111 1001
1000 1111	

[1]

- (b) – CIR (Current Instruction Register)
 – PC (Program Counter)
 – Acc (Accumulator)

[3]

- (c) – Controls operation of memory, processor and input/output
 – Instructions are interpreted
 – Sends signals to other components telling them “what to do”

[3]

- 4 (a) (i) Free software / open source software

[1]

(ii) Any **three** from:

- Set of principles / laws that regulate the use of computers
- Covers intellectual property rights (e.g. copying of software)
- Privacy issues (e.g. accessing personal information)
- Impact of computers on society (relevant examples can be credited)

[3]



(b) 1 mark for each CORRECT row

Statement	Firewall	Proxy server
Speeds up access of information from a web server by using a cache		✓
Filters all Internet traffic coming into and out from a user's computer, intranet or private network	✓	✓
Helps to prevent malware, including viruses, from entering a user's computer	✓	
Keeps a list of undesirable websites and IP addresses	✓	✓

[4]

(c) **one** mark for method + **one** mark for linked reason (maximum 6 marks)

- back up files...
- ...on a regular basis/to another device/to the cloud
- set data to read only...
- ...to prevent accidental editing
- save data on a regular basis...
- ...to prevent loss/corruption of data in unexpected shutdown/failure
- use correct shut down/start up procedures...
- ...to prevent damage to components/stored files
- use correct procedures before disconnecting portable storage device...
- ...to prevent damage to device/data corruption
- keep storage devices in a safe place...
- ...away from fire hazards

[6]

- 5 (a) – Memory card/SSD/HDD/magnetic tape
– Suitable description of device given

[2]

- (b) 2 hours = 120 minutes
 $120 \times 180 = 21\,600$
 $21\,600 / 1024$ (or $21\,600 / 1000$)
= **21.1 GB (or 21.6 GB)**

(1 mark for correct answer and 1 mark for correct calculation)

[2]

- 6 Any **two** from:
- facial recognition software/biometric software used to scan face
 - face image converted to digital format/data by the camera
 - digital image formed from scanned photo/biometric data stored in passport
 - key features of the face are checked/compared

[2]

Question	Answer	Marks
3(a)	Three from: • Malicious software // type of malware • Tracks / records keypresses // keylogger • Sends data to third party • Collected data is analysed to obtain data	3
3(b)	One mark for identified method, one mark for how it prevents spyware: Drop-down boxes // onscreen / virtual keyboard • Means key logger cannot collect data Only requires part of the password • Hacker doesn't get the full password Two-step verification // Two-factor authentication • Extra data is sent to device making it more difficult for hacker to obtain it • Data has to be entered into the same system // if attempted from a remote location, it will not be accepted Use a biometric device • The person's biological data (e.g. their fingerprint) is also required	2
3(c)	Four from: • Monitors traffic coming into and out of the computer system • Checks that the traffic meets any criteria / rules set • Blocks any traffic that does not meet the criteria / rules set • Allows a set blacklist / whitelist // can block certain IP addresses • Can close certain ports	4
3(d)	Two from: • Passwords // biometrics • Levels of access • Proxy servers • Physical security methods – e.g. PC's in locked rooms, etc.	2

Question	Answer	Marks
4(a)	One from: • Touch screen • Keyboard • Microphone • Mouse	1
4(b)	One from: • Headphones • Speakers • Printer • Light / LED	1
4(c)	One from: • HDD • SSD • USB drive	1
4(d)	Four from: • QR code is scanned using a <u>camera</u> on a mobile device ... • ... and read / decoded using an application / software • Illuminator shone on code • Squares reflect light differently • Corners of code are used for orientation • Opens document with information // Directs to website with information • QR code can be saved for future reference	4