CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0478 COMPUTER SCIENCE

0478/12 Paper 1, maximum raw mark 75

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 risk + 1 mark for corresponding reason why it is a risk and 1 mark for method of 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 http**s**
check the URL matches the intended site

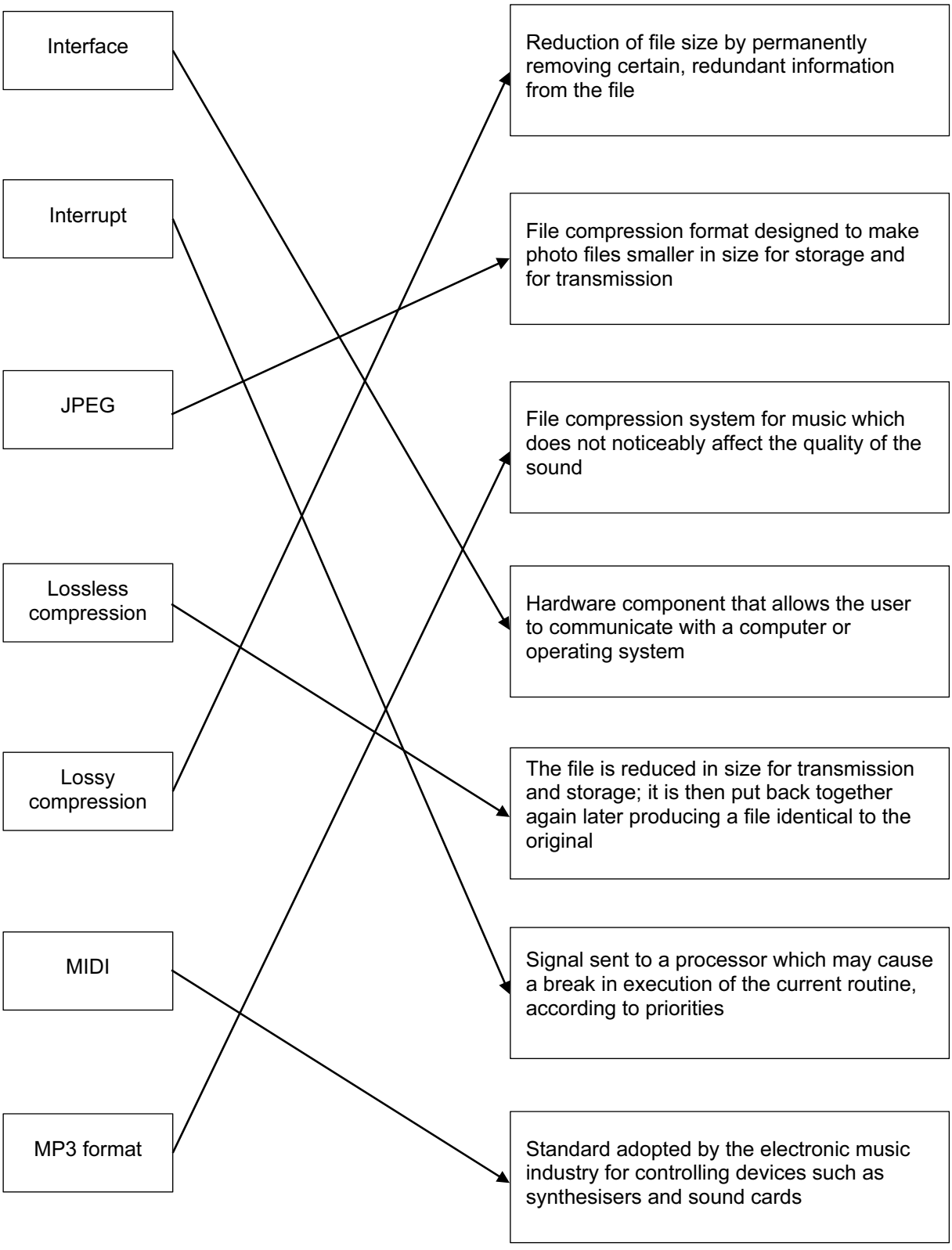
Risk: credit card fraud/identity theft
Reason: loss of money due to misuse of card/stealing data
Minimised: set passwords
encrypt data/encryption

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.

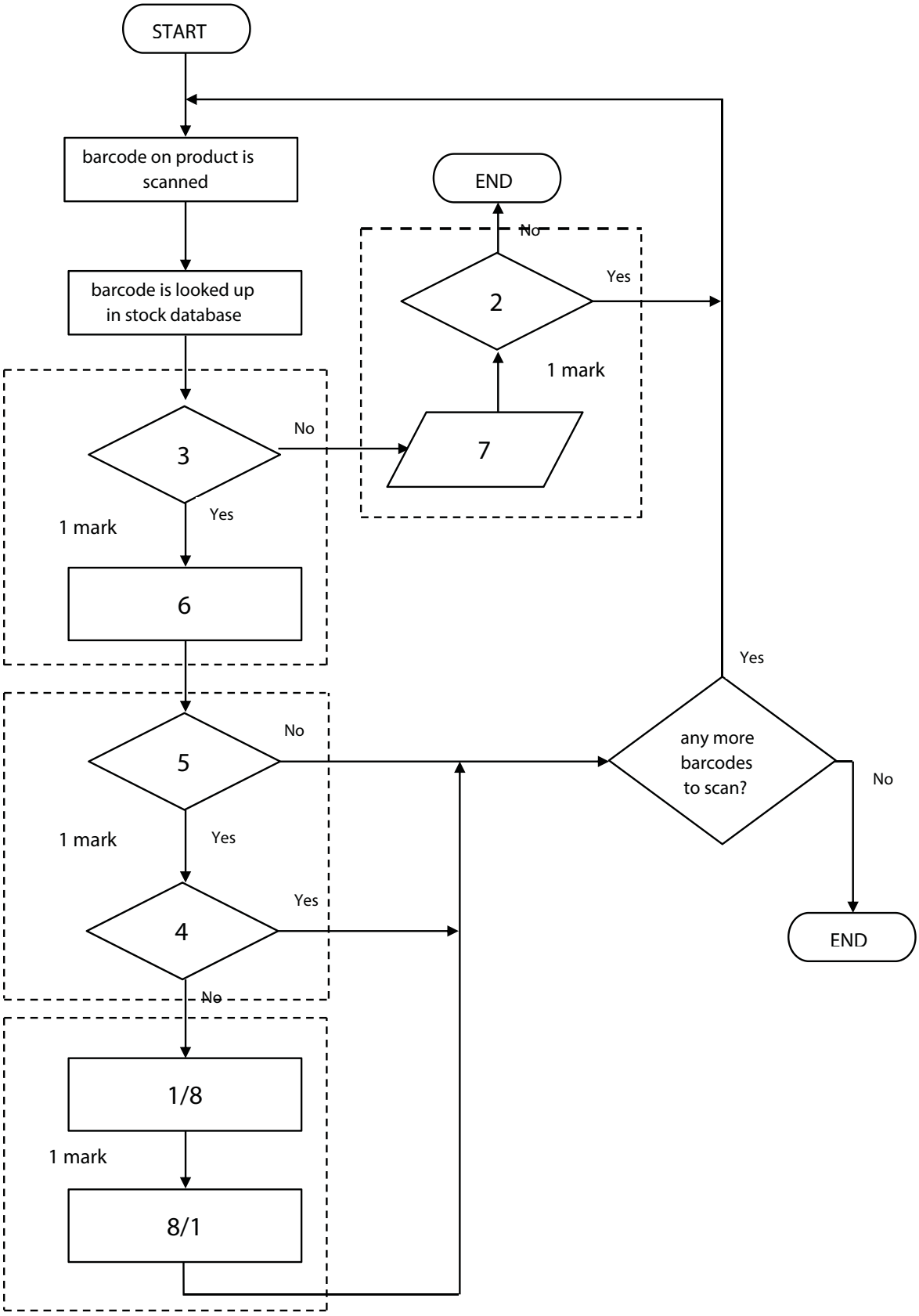
[9]

2



[6]

3



[4]

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 <u>uniquely</u> identified [1]

5 (a) Any **five** from:
- naming a suitable sensor, e.g infra-red, pressure, motion sensors, send signal/data 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 × 60 × 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]

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 [3]

(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/translates the HTML document
- interprets/translates 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 × 1) + (2 × 2) + (4 × 3) + (1 × 4) + (5 × 5) + (0 × 6) + (8 × 7)

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

105/11 = 9 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]

9 (a) RAM
– contains instructions/program/data currently in use

ROM
any **one** from**:**
– contains the start-up/bootstrap program
– contains/stores the setting for frequency (can't be changed)

Solid state drive
– stores the instructions/program/data (to operate the car) [3]

(b) 1 mark for device and 1 mark for corresponding reason

Device:
– touch screen
– key pad (NOT keyboard)

Reason:
– easy to use interface
– limited number of options
– small space/space is limited
– other devices such as mouse, keyboard, trackerball, … not suitable [2]

(c) Any **two** from:
– A solid state drive has no moving parts
– A solid state drive has faster random access
– A solid state drive has a quick start up/shut down time (reduced latency)
– A solid state drive is very small
– A solid state drive is very light
– A solid state drive consumes very little power
– A solid state drive does not generate a lot of heat (therefore safer in this application) [2]