

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge Ordinary Level

## **MARK SCHEME for the May/June 2015 series**

# **2210 COMPUTER SCIENCE**

**2210/12**

Paper 1, maximum raw mark 75

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

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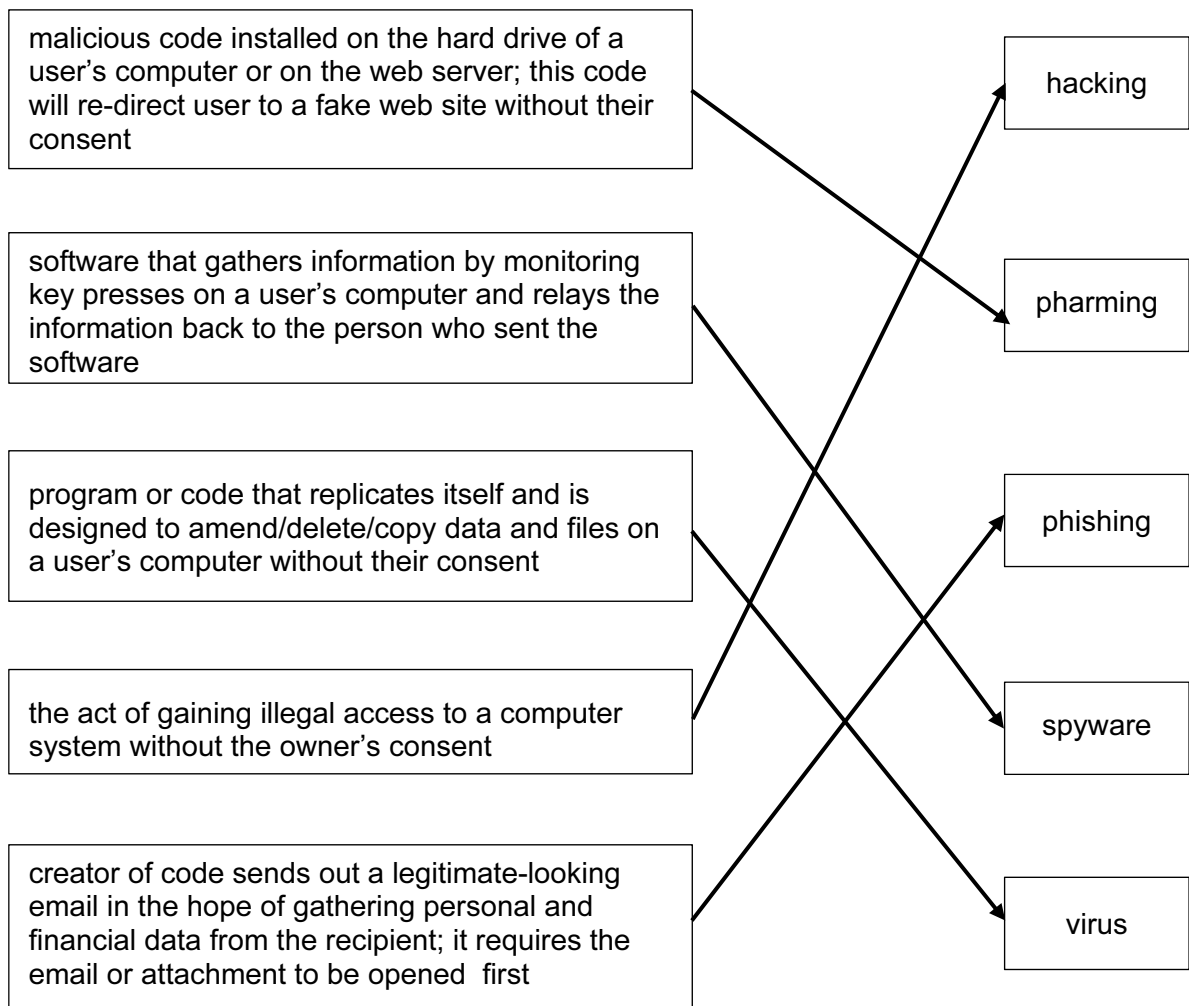
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1 (a) 1 mark per correctly placed tick

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]

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- 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:**

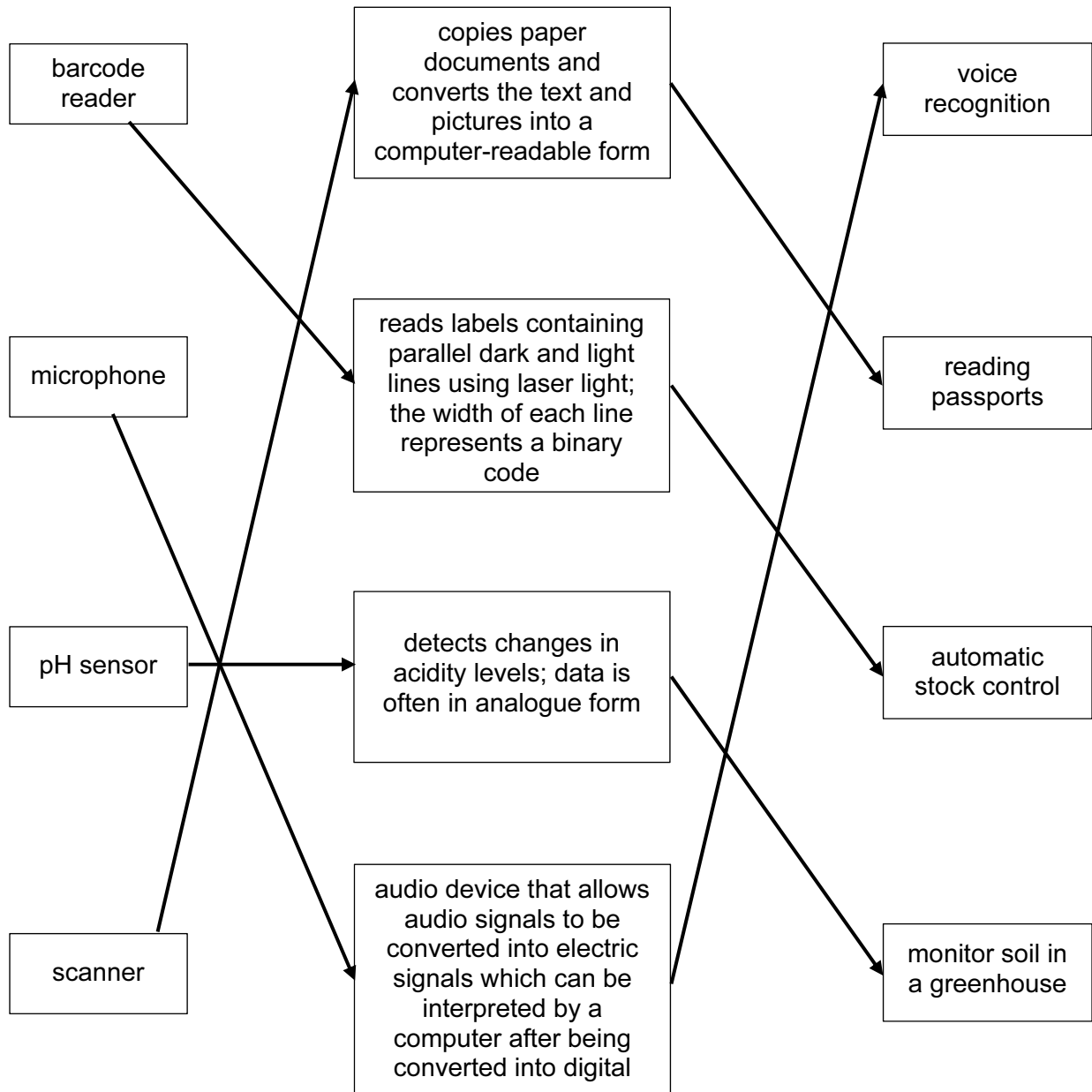
- good durability
- allows multi-touch facility
- can use stylus/finger/gloved finger/pen

**drawbacks:**

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

[2]

3



Input Device to Description  
 3/4 matches – 3 marks  
 2 matches – 2 marks  
 1 match – 1 mark

Description to Application  
 3/4 matches – 3 marks  
 2 matches – 2 marks  
 1 match – 1 mark

[6]

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

- secure sockets layer
- encrypts data being transmitted
- use of https
- use public and private keys

[1]

(b) 1 mark for each number in the correct order, next to the correct stage.

<b>Stage</b>	<b>Sequence number</b>
the encrypted data is then shared securely between the web browser and the web server	<b>6</b>
<i>the web browser attempts to connect to a web site which is secured by SSL</i>	<b>(1)</b>
the web server sends the web browser a copy of its SSL certificate	<b>3</b>
the web browser requests the web server to identify itself	<b>2</b>
the web server will then send back some form of acknowledgement to allow the SSL encrypted session to begin	<b>5</b>
the web browser checks whether the SSL certificate is trustworthy; if it is then the web browser sends a message back to the web server	<b>4</b>

[5]

5 (a) 1 mark per correctly placed tick

Received byte	Byte transmitted correctly	Byte transmitted incorrectly
1 1 0 0 1 0 0 0		✓
0 1 1 1 1 1 0 0		✓
0 1 1 0 1 0 0 1	✓	

[3]

(b) (i) byte number: 7

column number: 6

[2]

(ii) Any **two** from:

- letter “A”(byte 7) transmitted as odd parity (three 1s)
- column 6 has odd parity (seven 1s)
- intersection of byte 7 and column 6 indicates incorrect bit value

[2]

(c) 190

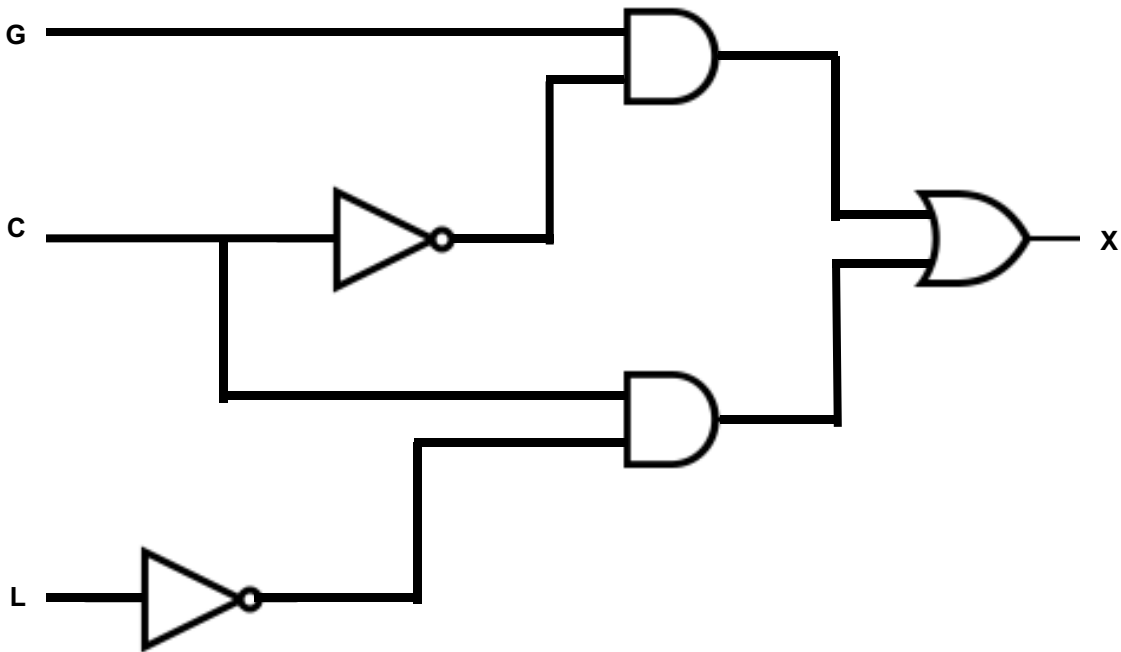
[1]

(d) Any **one** from:

- 2 bits interchanged (e.g. 1 → 0 and 0 → 1) that won't change parity value
- even number of bits/digits are transposed
- If there are multiple errors in the same byte/column, that still produce the same parity bit, the error will not be detected

[1]

6 (a) 1 mark per correct logic gate, correctly connected



[5]

(b)

G	C	L	Workspace	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

] 1 mark

] 1 mark

] 1 mark

] 1 mark

[4]

(c) 1 mark for correctly completed truth table

<i>A</i>	<i>B</i>	<i>C</i>
0	0	<b>0</b>
0	1	<b>1</b>
1	0	<b>1</b>
1	1	<b>0</b>

[1]

7 (a) Maximum 5 marks **in total** for question part

Description of how street light is controlled: **(max 4 marks)**

- sensor sends signal/data to the microprocessor
- signal/data converted to digital/using ADC
- microprocessor compares value to a stored value
- if input value < stored value ...
- ... signal sent from microprocessor to actuator
- ... and light is switched on/off
- whole process continues in an infinite loop

Avoiding frequent on/off switches: **(max 2 marks)**

- microprocessor continues to keep light on/off for a pre-determined period
- after pre-determined period, sensor output is again sampled

[5]



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- (b) 1 mark for correct sensor, 1 mark for its matching application  
(all THREE applications must be different)

<b>sensor</b>	<b>application</b>
infra-red/motion	automatic doors burglar alarm systems
temperature	chemical process central heating/air con system greenhouse environment oven
sound/acoustic	burglar alarm systems leak detection system disco lighting
moisture/humidity	clothes drier environmental control (greenhouse, air con)
pressure	burglar alarm system traffic light control chemical process
carbon dioxide/ oxygen/gas	pollution monitoring in a river greenhouse environment (growth control) confined area (e.g. space craft) Fish tank/Aquarium
magnetic field	mobile phone anti-lock braking CD players

[6]

- 8 1 mark per correct word

Freeware

Shareware

Free software

(Computer) Ethics

Plagiarism

[5]

9 (a) 1 mark per correctly placed tick

statement	interpreter	compiler
creates an executable file that runs directly on the computer		✓
more likely to crash the computer since the machine code produced runs directly on the processor		✓
easier to debug since each line of code is analysed and checked before being executed	✓	
slow speed of execution of program loops	✓	
it is more difficult to modify the code since the executable code is now in machine code format		✓

[5]

(b) Any **one** from:

- code is required to be converted into machine code/binary
- code needs to be produced that can be understood by the computer

[1]

(c) Any **one** from:

- close to English/native/human language
- easier/faster to correct errors/read/write
- works on many different machines/operating systems (portable)

[1]

(d) Any **one** from:

- work directly on registers/CPU
- more control over what happens in computer
- can use machine specific functions

[1]

(e) 1 mark per correct letter, maximum 2 marks

- Assembly code:           **B**  
 High-level language code: **C**  
 Machine code:           **A**

[2]

**10 (a)** 1 mark for two correct lines, 2 marks for four correct lines

<b>L (108):</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>I (105):</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>G (103):</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>N (110):</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

[2]

**(b)** 1 mark for each correct binary value  
1 mark for each correct hexadecimal value

								hexidecimal
<b>L:</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>D8</b>
<b>G:</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>CE</b>

[4]