



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**COMPUTER SCIENCE**

**0478/12**

Paper 1

**May/June 2016**

MARK SCHEME

Maximum Mark: 75

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**Published**

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- 1 compiler  
 assembler  
 interpreter [3]

2

<b>Application</b>	<b>Sensor</b>
<i>controlling street lights</i>	<b>Light</b>
<i>monitoring a river for pollution</i>	<b>Gas, pH, temperature, light</b>
<i>controlling traffic lights</i>	<b>pressure, magnetic field,</b>

*NOTE: The same sensor cannot be given twice* [3]

- 3 (a) 1 mark for each nibble  
 0100 1010 1111 [3]

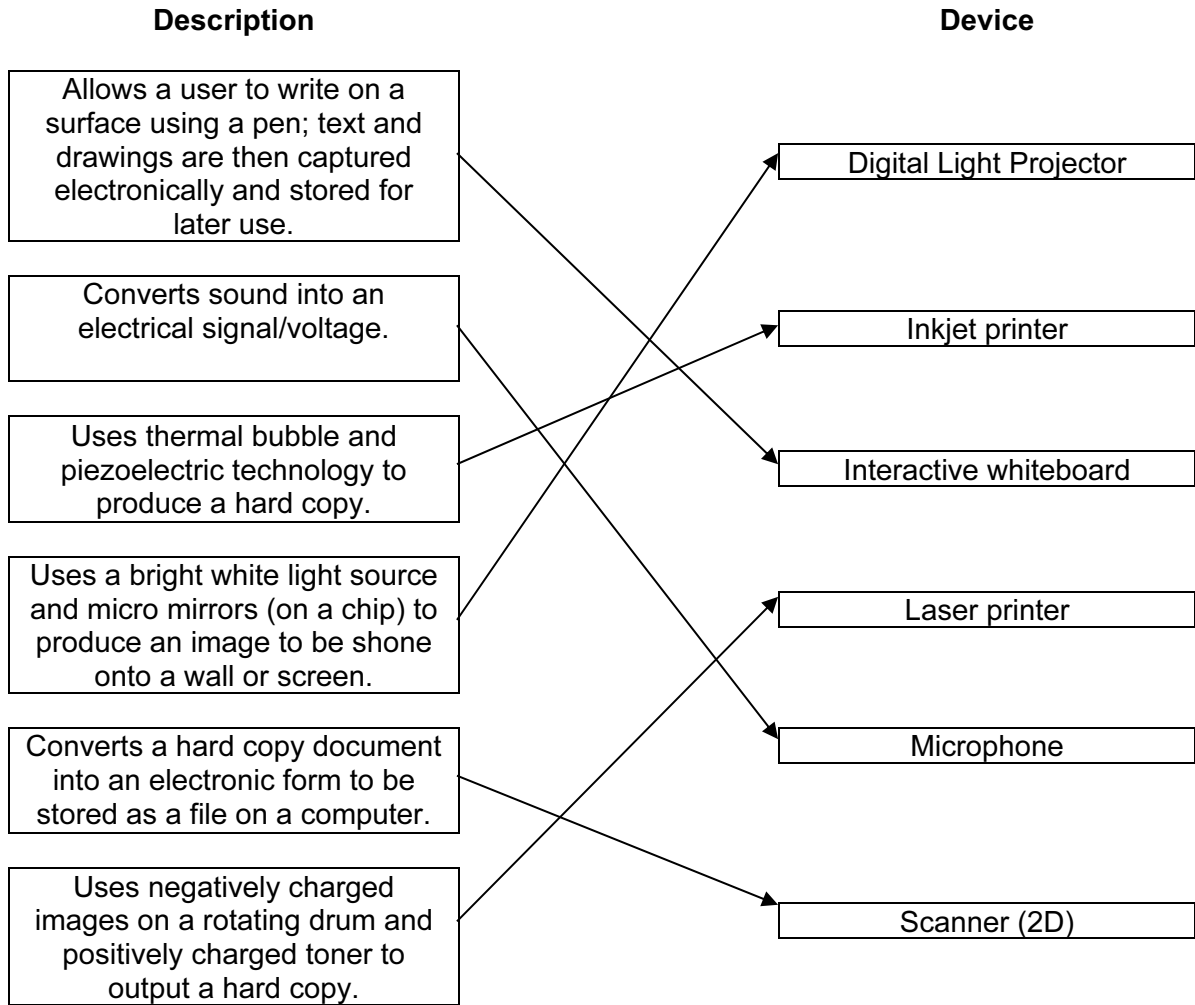
- (b) (i) 0 1 1 0 1 0 0 1      105 hours      1 mark  
 0 0 0 1 1 1 1 1      31 minutes      1 mark  
 0 0 1 1 0 0 1 0      50 seconds      1 mark [3]

- (ii) 1F [1]

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- 4 (a) Any **three** from:
- The file can be compressed
  - The compression that is used is lossless (not lossy)
  - use of a compression algorithm
  - repeated words can be indexed
  - repeated word sections (e.g. “OU”) can be replaced by a numerical value
  - reference to zip files
  - save file as a pdf/convert to pdf
- [3]
- (b) Any **four** from:
- the checksum for the bytes is calculated
  - this value is then transmitted with the block of data
  - at the receiving end, the checksum is re-calculated from the block of data received
  - the calculated value is then compared to the checksum transmitted
  - if they are the same value, then the data was transmitted without any error
  - if the values are different, then an error has been found
  - if the values are different, then a request is sent for the data to be re-transmitted
- [4]

5



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

[5]

6 (a)

Type	Tick (✓)	Method	Tick (✓)
simplex		serial	
half-duplex		parallel	✓
full-duplex	✓		

Type	Tick (✓)	Method	Tick (✓)
simplex	✓	serial	✓
half-duplex		parallel	
full-duplex			

Type	Tick (✓)	Method	Tick (✓)
simplex		serial	✓
half-duplex	✓	parallel	
full-duplex			

[6]

(b) Any **two** from:

- single wire means there is less chance of interference/data corruption
- single wire reduces costs
- more reliable over greater distances
- bits will still be synchronised after transmission

[2]

7 (a)

<b>A</b>	<b>B</b>	<b>C</b>	Working space	<b>X</b>
<i>0</i>	<i>0</i>	<i>0</i>		<b>0</b>
<i>0</i>	<i>0</i>	<i>1</i>		<b>1</b>
<i>0</i>	<i>1</i>	<i>0</i>		<b>0</b>
<i>0</i>	<i>1</i>	<i>1</i>		<b>1</b>
<i>1</i>	<i>0</i>	<i>0</i>		<b>0</b>
<i>1</i>	<i>0</i>	<i>1</i>		<b>1</b>
<i>1</i>	<i>1</i>	<i>0</i>		<b>1</b>
<i>1</i>	<i>1</i>	<i>1</i>		<b>0</b>

4 marks for 8 correct X bits

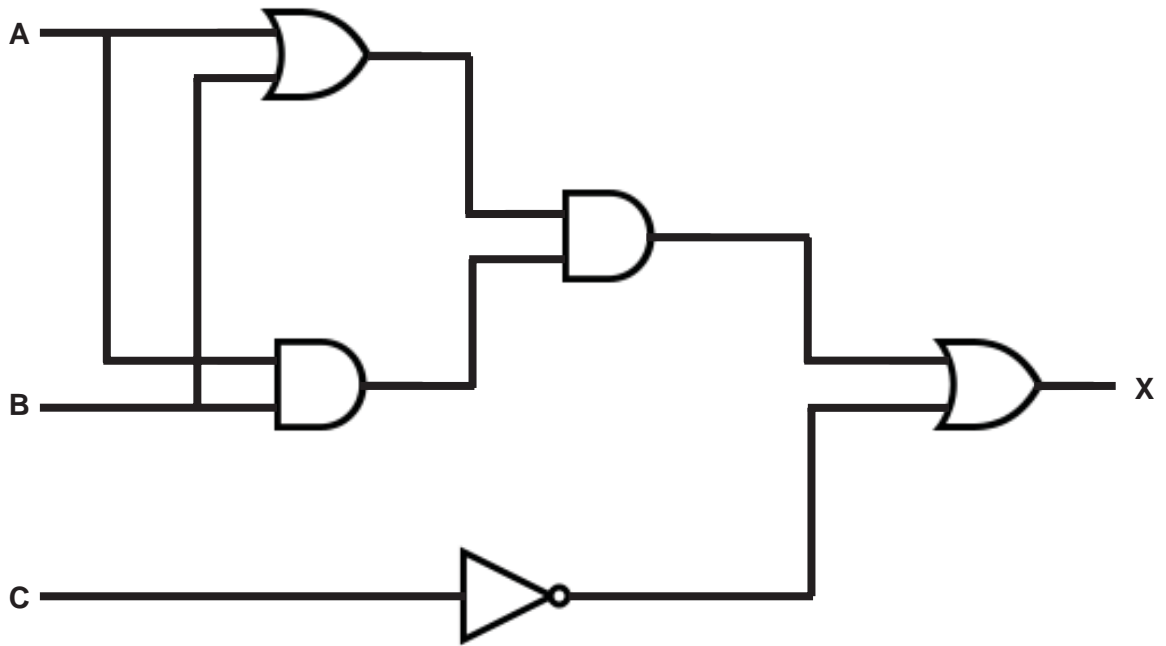
3 marks for 6 correct X bits

2 marks for 4 correct X bits

1 mark for 2 correct X bits

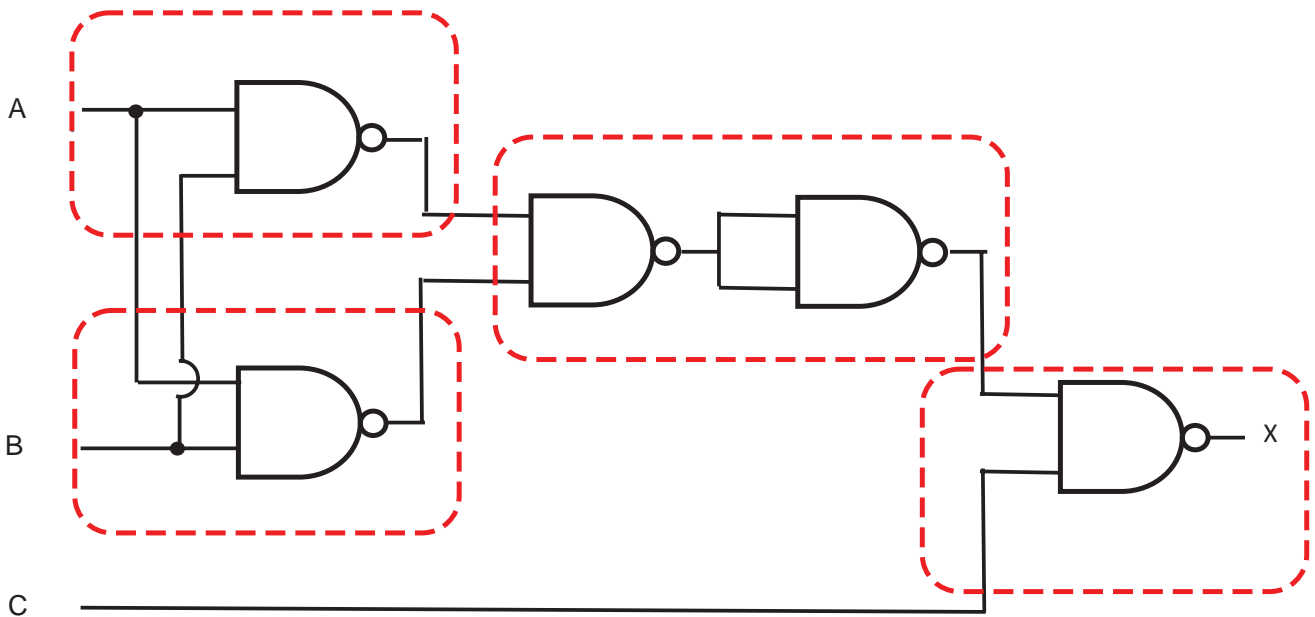
[4]

(b) 1 mark for each correct gate with correct source of input



[5]

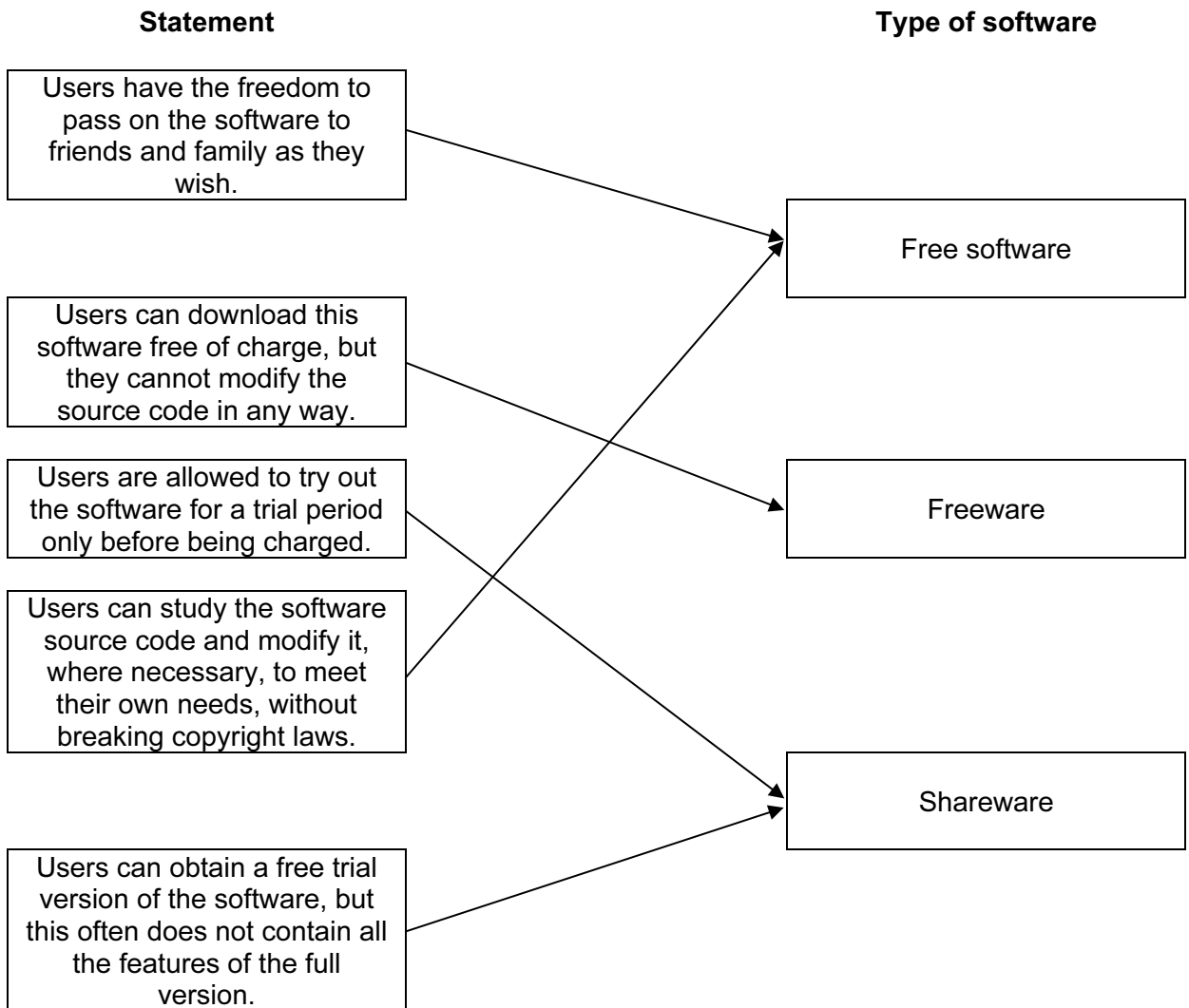
(c) Each dotted area is 1 mark



[4]

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]