



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

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**COMPUTER SCIENCE**

**0478/13**

Paper 1

**October/November 2016**

MARK SCHEME

Maximum Mark: 75

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**Published**

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- 1** In any order:
- Fetch
  - Decode
  - Execute
- [3]

- 2**
- Hacking
  - Virus
  - Cookies
  - Cracking
  - Pharming
- [5]

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Computer term	Description
Serial, simplex data transmission	Several bits of data sent down several wires, in both directions, but not at the same time
Parallel, half-duplex data transmission	Several bits of data sent down several wires, in both directions, at the same time
Parity check	An even or odd number of bits set to 1 in a byte, used to check if the byte has been transmitted correctly
Automatic repeat request (ARQ)	One bit sent at a time, over a single wire in one direction only
Checksum	An additional digit placed at the end of a number to check if the number has been entered correctly
	A value transmitted at the end of a block of data; it is calculated using the other elements in the data stream and is used to check for transmission errors
	An error detection method that uses response and time out when transmitting data; if a response is not sent back to the sender in an agreed amount of time, then the data is re-sent

[5]

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

- Easy to make a mistake
- Can be slow if not trained
- Dirt/food can get into keys

[2]

(b) Any **two** with identification and explanation from:

- Fewer typing errors may be made ...
- ... because one button is pressed to order an item
- Speed up the time to enter an order ...
- ... because fewer buttons are pressed to complete the order
- May require less training ...
- ... because it is easier to identify an order item from its image rather than typing it
- Can stop dirt/food damage ...
- ... normally has a protective layer // because there are no keys for dirt/food to get into

[4]

(c) 1 mark for security measure, 1 mark for description.

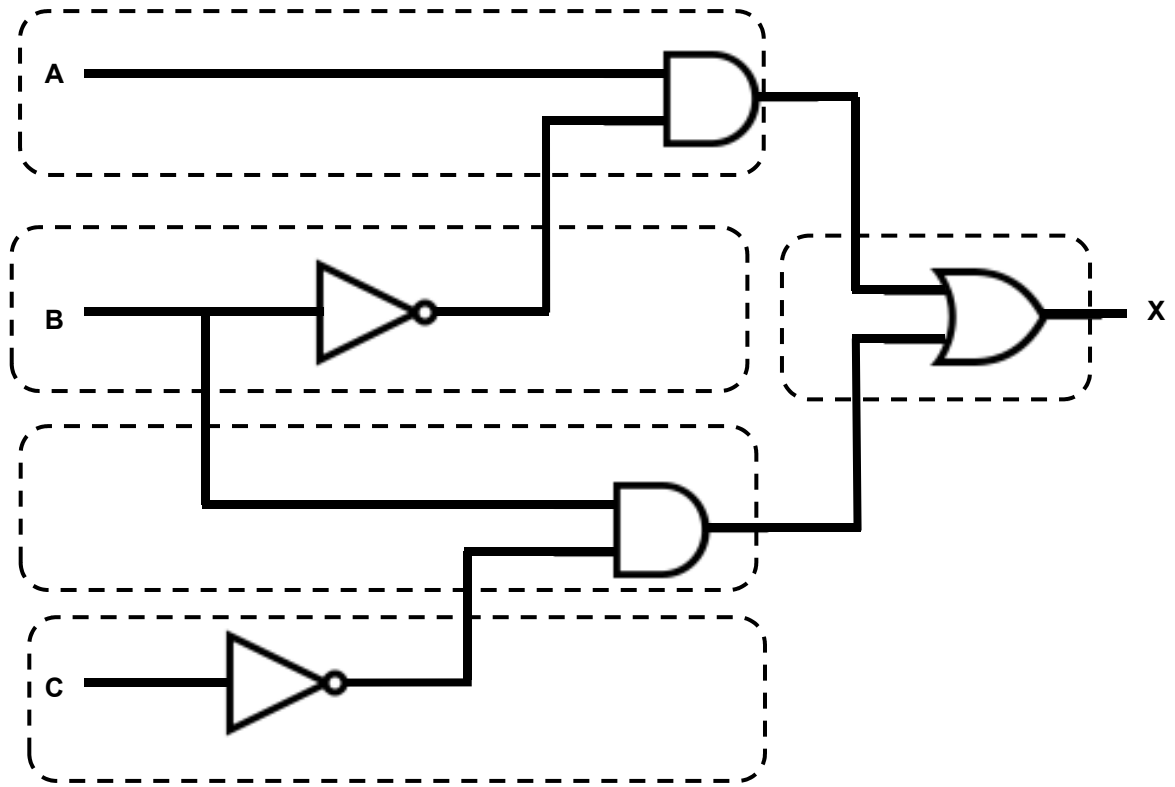
Any **two** from:

- Encryption
- If the data is accessed or stolen it will be meaningless
  
- Biometric device
- Can help prevents unauthorised access to the system (only award once)
  
- Firewall
- Can alert to show unauthorised access attempt on the system
- Can help prevent unauthorised access to the system (only award once)
- Can help protect against viruses and malware entering the system
  
- Anti-spyware
- Can stop the keys being logged that, when analysed, would reveal the password to the data

[4]

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5 (a) 1 mark per correct section.



[5]

(b) 4 marks for 8 correct values  
 3 marks for 6 correct values  
 2 marks for 4 correct values  
 1 mark for 2 correct values

A	B	C	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]

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(c) Register Z [1]

(d) (i) (byte) 5 [1]

(ii) (column) 4 [1]

(iii) corrected byte is: **1 0 0 1 1 1 1 1** [1]

(iv) that gives the value: **1 5 9**  
(follow through applies) [1]

(v) Any **two** from:

- The byte would be transmitted without having 5 consecutive 1's
- The fault condition would not be recognised [2]

6 Any **two** from:

High level language

- easier/faster to write code as uses English-like statements
- easier to modify as uses English-like statements
- easier to debug as uses English-like statements
- portable language code

Any **two** from:

Low level language

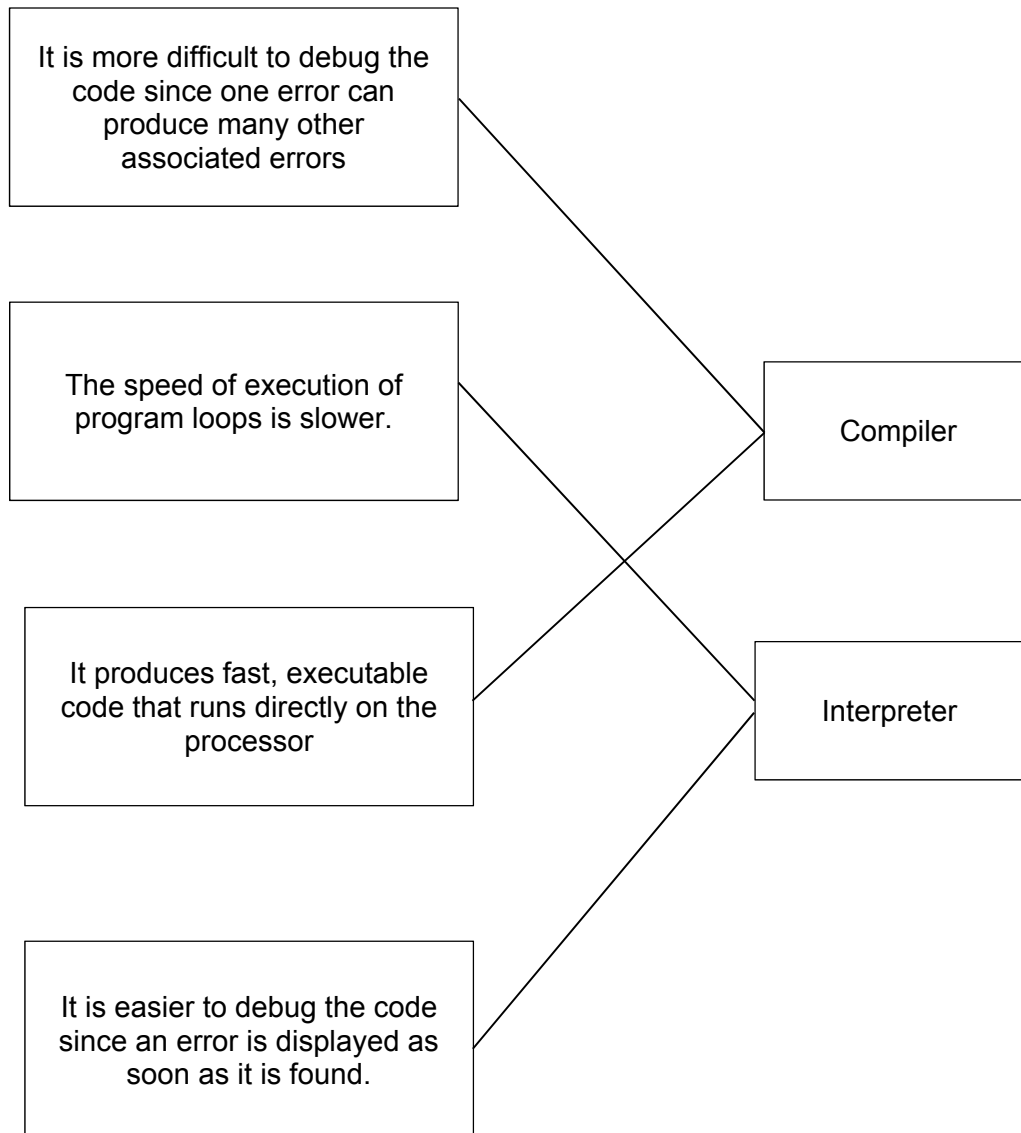
- can work directly on memory locations
- can be executed faster
- translated program requires less memory [4]

7 Any **four** from:

- reaches maximum brightness quickly
- colours are vivid
- good colour definition/contrast can be achieved
- screens can be thinner/thin
- more reliable as LED's are long lasting
- consume very little/less energy [4]

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[4]

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9 Any six from:

- infrared / motion / pressure (sensor) // sensor detects movement/pressure
  - signals/data sent (continuously) to microprocessor
  - converted from analogue to digital (using ADC)
  - microprocessor compares value with those stored in memory
  - if sensor value does not match the stored value(s) ...
  - ... signal sent to switch on the light
  - ... signal sent to keep the light on
  - ... light remains on for a period of time (30 seconds)
  - if sensor value matches the stored value(s) ...
  - ... light will remain off
  - ... will turn off after period of time (30 seconds)
  - works in a continues loop
- [6]

10 (a) (i) 2 marks for 3 correct binary conversions, 1 mark for 2 correct binary conversions [2]

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

(ii) 1 mark for each correct hex value converted

**1 A F** [3]

(b) 2 marks for working + 1 mark for correct answer

Working

- $1200 \times 8 = 9600$  (bytes)
- $9600/1024$  or  $9600/1000$

Answer

- 9.4 or 9.6 kilobytes [3]

(c) Any one from:

MAC address

- Media Access Control (address)
- unique number that identifies a device (connected to the Internet)
- address is made up of manufacturer id + serial number of device
- address is allocated by the manufacturer

Any one from:

IP address

- Internet Protocol (address)
  - location/address of a device on the Internet
  - address is unique for given Internet session
  - address is supplied when a device connects to the Internet
  - address is allocated by the network
- [2]



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- (d) – record (layer)  
– handshake (layer) [2]

**11** Any **six** from:

- Help stop the misuse of computers
- The use of computers needs to be governed
- Help keep users safer when using computers
- Provides rules for using computers
- Help stop intellectual property theft
- Helps prevent the misuse of personal information
- Reference to laws (relevant example)
- Reference to security issues (relevant example)

NOTE: Answer must refer to the importance of ethics and be more than a description of ethics. [6]