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Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMPUTER SCIENCE **0478/12**

Paper 1 **May/June 2017**

MARK SCHEME

Maximum Mark: 75

Published

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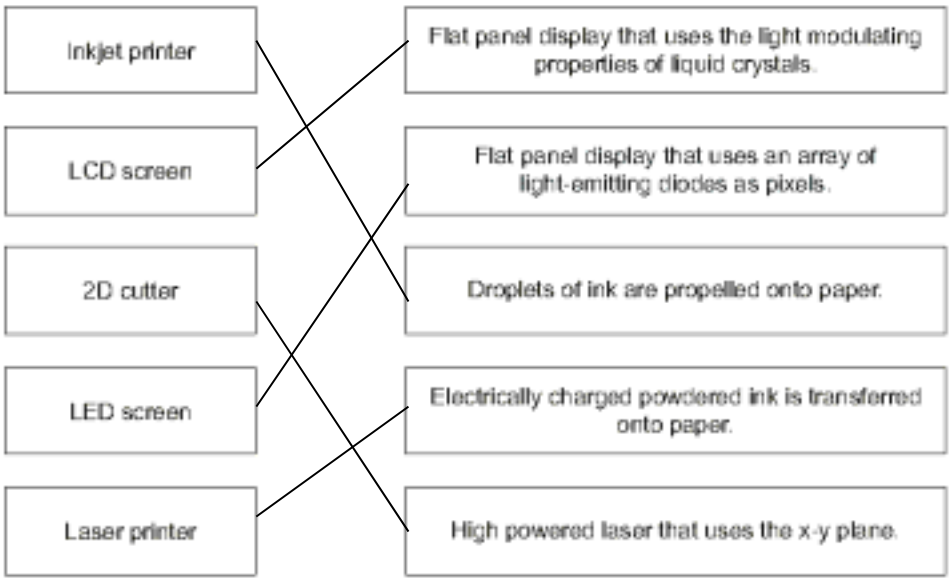
Question	Answer	Marks
1	• address (bus) • control (bus) • data (bus)	3

Question	Answer	Marks
2	2 marks for each type of storage **Primary storage** • RAM • ROM **Secondary storage** • hard disk drive (HDD) • solid state drive (SSD) **Off-line storage e.g.** • CD • DVD • Blu-ray • Flash memory // USB storage • removable / external / portable hard disk drive (HDD/SSD) • SD card	6

Question	Answer	Marks
3	 1 mark for each correct line to a max of 4 marks.	4

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Question	Answer	Marks
4	**Two** marks for each correct description **Parity Check** • Checks a byte of data • Check is performed when data is received • A parity bit is added (to the parity byte) • Counts / checks number of 1's // counts / checks to see if 1's are even // counts / checks to see if 1's are odd • Can be <u>even</u> or <u>odd</u> • If parity is incorrect, error is detected **Check digit** • A digit that is calculated from the data // uses modulo to calculate digit // valid description of modulo • It is appended / added to the data • Digit is recalculated when data is entered • Digits are compared to check for error **Checksum** • A value is calculated from the data // Valid description of calculation • It is transmitted with the data • Value is recalculated after transmission • Values are compared after transmission to check for error **Automatic Repeat reQuest** • Uses acknowledgement / request and time-out • Error control protocol • Check performed on receiving data // error is detected by e.g. parity check, check sum • If error detected, request is sent to resend data // negative acknowledgement is used • Resend request is repeated till data is sent correctly / requests time out / limit is reached • Send acknowledgement that data is received // positive acknowledgement is used • If acknowledgement not received in set time data is resent	**8**

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Question	Answer	Marks
5(a)	1 mark for correct method, 1 mark for correct answer 32 + 16 + 8 + 1 (00)111001	**2**
5(b)	registers **must** have leading zeros, allow follow through from 5(a) for an incorrect value 1 mark for each correct register. **0 0 1 1 1 0 0 1** **0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 1**	**2**
5(c)	**Two** from: • data • ASCII value / Unicode value / character • number • part of image / small image • a sound / sound sample / small sound track • instruction	**2**
5(d)	3A	**1**

Question	Answer	Marks
6	1 mark for correct name of code, up to a further 3 marks for appropriate explanation • Quick response (QR) Code **Three** from: • Barcode is captured / scanned / imaged, by a camera / scanner / barcode reader / QR code reader • Read using a laser • Processed by an app • Light is reflected back • Black squares reflect less light than white squares • Modules are used for orientation / alignment • Squares / data are decoded	**4**

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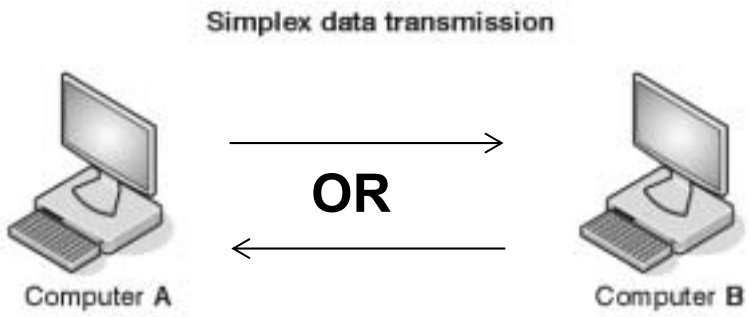
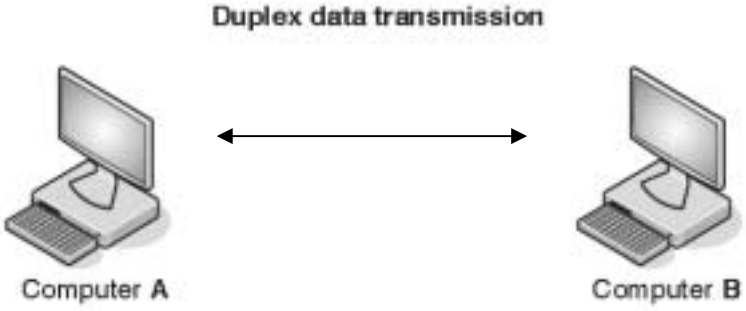
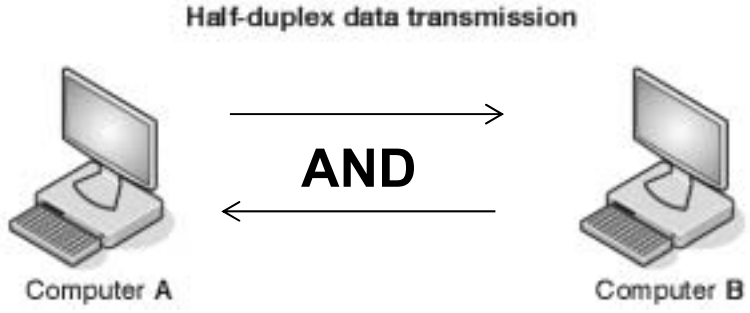
Question	Answer	Marks
7(a)	1 mark for correct arrow(s), one mark for correct description  (Direction of data is) one way only // unidirectional  (Direction of data is both ways) at same time / simultaneously / concurrently  (Direction of data is both ways) but at different times / not at the same time / not simultaneously / not concurrently	6

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Question	Answer	Marks
7(b)	1 mark each use, must be different. **Simplex** e.g.: Microphone to computer Sensor to computer Computer to printer Computer to speaker Computer to monitor Webcam to computer Sending data to a device // sending data from a device **Duplex** e.g.: Telephone call Voice over IP Computer to printer (only award once) Instant messaging Broadband connections Video conferencing Sending data to and from devices e.g wireless technology Computer to modem	**2**
7(c)	2 marks for IC, 2 marks for USB **IC** • parallel transmission // description of parallel • for sending data internally **USB** • serial transmission // description of serial • for sending data externally (to and from peripherals / between devices)	**4**

Question	Answer	Marks
8(a)	2 marks for SSL, 2 marks for Firewall **SSL protocol** **Two** from: • uses encryption • encryption is asymmetric / symmetric / both • makes use of (public and private) keys • data is meaningless (without decryption key / if intercepted) **Firewall** **Two** from: • helps prevent unauthorised access // helps prevent hacking • checks that data meets criteria // identifies when data does not meet criteria • acts as a filter for (incoming and outgoing) data // blocks any unacceptable data //allows acceptable data through	**4**

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Question	Answer	Marks
8(b)	**Six** from: Encrypt the data … … so it cannot be understood by those not entitled to view it Password protected / biometrics … … to help prevent unauthorised access Virus checking software … … helps prevent data corruption or deletion … identifies / removes a virus in the system … scans a system for viruses Spyware checking software … … helps prevent data being stolen/copied/logged … scans a system for spyware Drop-down input methods / selectable features … … to reduce risk of spyware / keylogging Physical method e.g. locked doors / CCTV timeout / auto log off … to help prevent unauthorised access Network / company policies // training employees … to educate users how to be vigilant Access rights … … allows users access to data that they have permission to view … prevents users from accessing data that they do not have permission to view	**6**

Question	Answer	Marks
9	**Six** from: • temperature sensor • analogue data / temperature is converted to digital data (with an ADC) • sensor sends signal to the microprocessor • microprocessor compares input values with stored values/pre-set values … • … if the temperature value input is too high/low … • … a signal is sent from the microprocessor to turn on / off / up / down the cooling unit • … if temperature matches the stored values … • … no action is taken • an actuator is used to turn the cooling unit on / off / up / down • the process is a continuous loop	**6**

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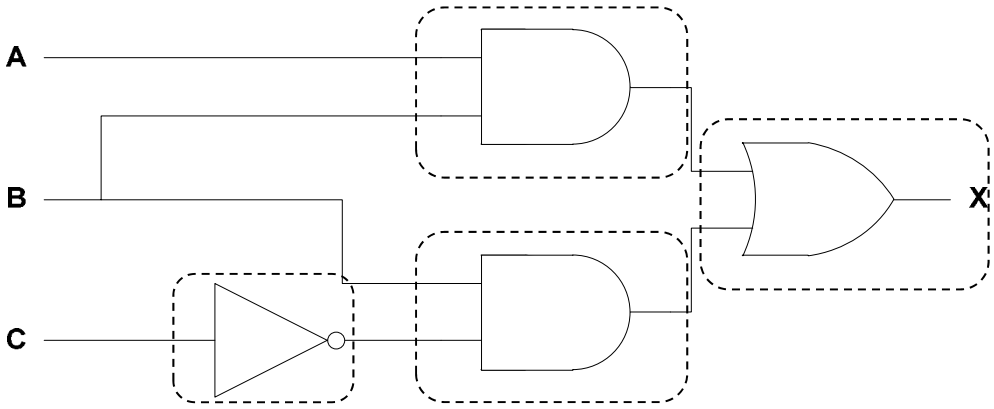
<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>10(a)</td><td>1 mark for each correct gate, with the correct input(s)
 
</td><td>4</td></tr>
<tr><td>10(b)</td><td>
<table>
<tr><th>A</th><th>B</th><th>C</th><th>X</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td></tr>
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<tr><td>1</td><td>1</td><td>1</td><td>1</td></tr>
</table>
4 marks for 8 correct outputs
3 marks for 6 or 7 correct outputs
2 marks for 4 or 5 correct outputs
1 mark for 2 or 3 correct outputs</td><td>4</td></tr>
</table>

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Question	Answer	Marks
11	**Seven** from: **Requested** • a web browser is used • user enters the URL / web address (into the address bar) // clicks a link containing the web address // clicks an element of the webpage • the URL / web address specifies the protocol • protocols used are Hyper Text Transfer Protocol (HTTP) / Hyper Text Transfer Protocol Secure (HTTPS) **Sent** • the URL / web address contains the domain name • the Internet Service Provider (ISP) looks up the IP address of the company • the domain name is used to look up the IP address of the company • the domain name server (DNS) stores an index of domain names and IP addresses • web browser sends a request to the web server / IP address **Received** • Data for the website is stored on the company's web server • webserver sends the data for the website back to the web browser • web server uses the customer's IP address to return the data • the data is transferred into Hyper Text Mark-up Language (HTML) • HTML is interpreted by the web browser (to display the website)	**7**