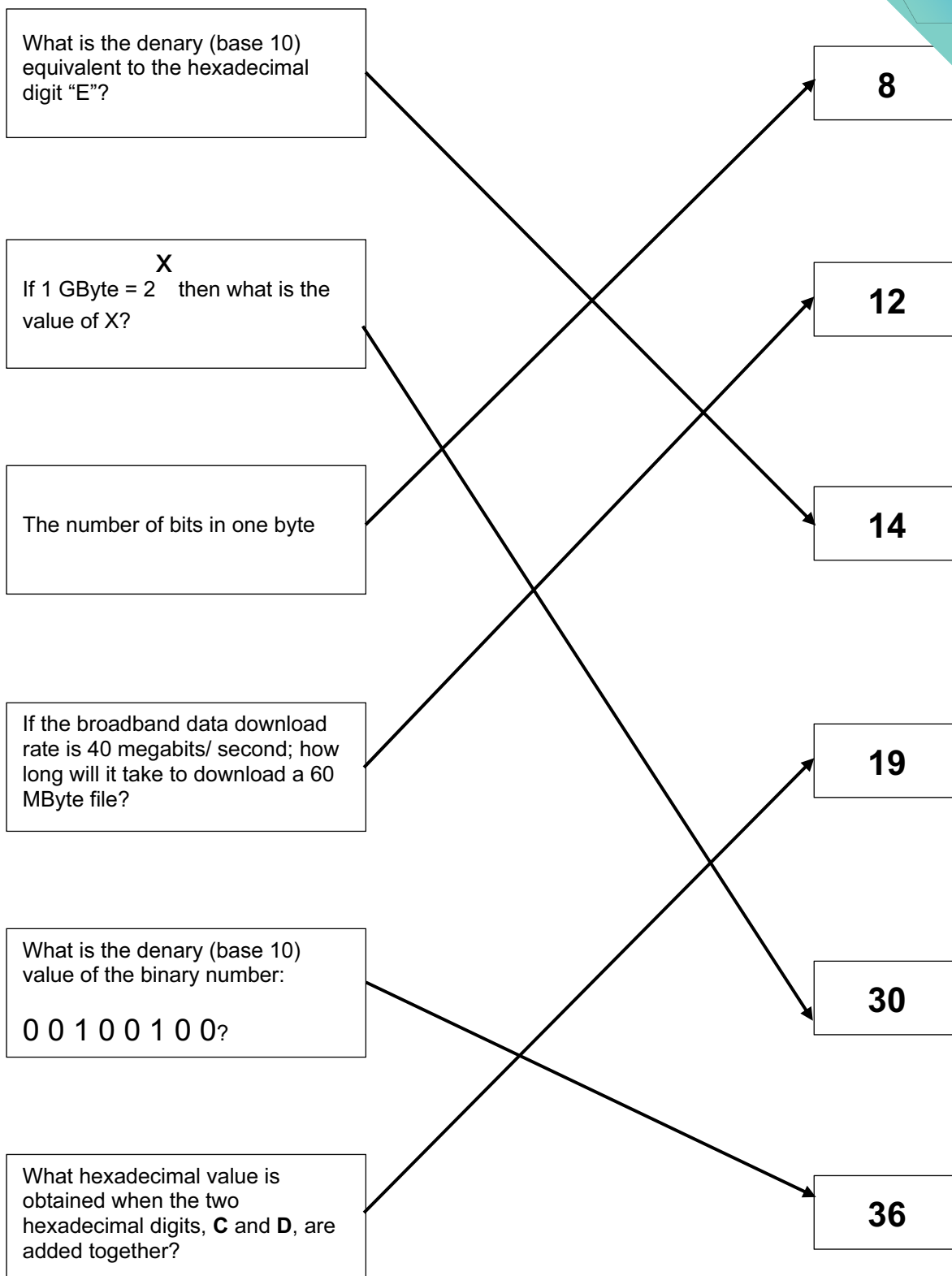


QUESTION 1.

Mark Scheme
Cambridge IGCSE – May/June 2015



9



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



10 1 mark per correctly placed tick

statement	interpreter	compiler
takes one statement at a time and executes it	✓	
generates an error report at the end of translation of the whole program		✓
stops the translation process as soon as the first error is encountered	✓	
slow speed of execution of program loops	✓	
translates the entire program in one go		✓

[5]

QUESTION 2.

PUBLISHED



Question	Answer	
1(a)	1 mark for any two correct values, 2 marks for all 4 correct values. 29FC	
1(b)	Two from: - Easier/quicker to understand/read - Easier to debug/identify errors - Fewer digits are used / shorter // takes up less space on screen // more can be shown on screen / page	
1(c)	Two from: - Notations for colour in HTML // HTML colour (codes) - Error messages - MAC address // IP address - Locations in memory - Memory dump	2

Question	Answer	Marks
2(a)	Two from: - Closer to human language // closer to English - Independent of a particular type of computer/device/platform // portable language - A language such as Python, Java, Pascal, etc. (any suitable example)	2
2(b)	One from: - Compiler - Interpreter	1
2(c)	Must relate to answer given in 2b. No follow through for incorrect answer in part 2b. Compiler – Three from: - Translates the whole program as a complete unit / at once - Creates an executable file / object code - A report / list of errors in the code is created - Optimises the source code (to run efficiently) Interpreter – Three from: - Translates a program one line of code at a time - Machine code is directly executed // The interpreter is used each time the program / code is executed - Will identify an error as soon as it finds one in a line of code	3



Question	Answer																	
3	1 mark per correct tick																	
	<table><tr><th>Statement</th><th>true (✓)</th><th>false (✓)</th></tr><tr><td>47KB is larger than 10MB.</td><td></td><td>✓</td></tr><tr><td>250bytes is smaller than 0.5MB.</td><td>✓</td><td></td></tr><tr><td>50GB is larger than 100MB.</td><td>✓</td><td></td></tr><tr><td>1TB is smaller than 4GB.</td><td></td><td>✓</td></tr></table>	Statement	true (✓)	false (✓)	47KB is larger than 10MB.		✓	250bytes is smaller than 0.5MB.	✓		50GB is larger than 100MB.	✓		1TB is smaller than 4GB.		✓		
Statement	true (✓)	false (✓)																
47KB is larger than 10MB.		✓																
250bytes is smaller than 0.5MB.	✓																	
50GB is larger than 100MB.	✓																	
1TB is smaller than 4GB.		✓																

Question	Answer	Marks																		
4	1 mark per correct tick <table> <tr> <th>Statement</th><th>True</th><th>False</th></tr> <tr> <td>Data is transmitted in one direction only, one bit at a time.</td><td></td><td>✓</td></tr> <tr> <td>Data is transmitted in both directions, multiple bits at a time.</td><td></td><td>✓</td></tr> <tr> <td>Data is transmitted in one direction only, multiple bits at a time.</td><td></td><td>✓</td></tr> <tr> <td>Data is transmitted in both directions, but only one direction at a time. Data is transmitted one bit at a time.</td><td>✓</td><td></td></tr> <tr> <td>Data is transmitted in both directions, but only one direction at a time. Data is transmitted multiple bits at a time.</td><td></td><td>✓</td></tr> </table>	Statement	True	False	Data is transmitted in one direction only, one bit at a time.		✓	Data is transmitted in both directions, multiple bits at a time.		✓	Data is transmitted in one direction only, multiple bits at a time.		✓	Data is transmitted in both directions, but only one direction at a time. Data is transmitted one bit at a time.	✓		Data is transmitted in both directions, but only one direction at a time. Data is transmitted multiple bits at a time.		✓	5
Statement	True	False																		
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Data is transmitted in both directions, but only one direction at a time. Data is transmitted multiple bits at a time.		✓																		

QUESTION 3.

PUBLISHED



Question	Answer																									
5(a)	1 mark for correct method, 1 mark for correct answer 32 + 16 + 8 + 1 (00)111001																									
5(b)	registers must have leading zeros, allow follow through from 5(a) for an incorrect value 1 mark for each correct register. <table border="1"><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td></tr></table> <table border="1"><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td></tr></table>	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
0	0	1	1	1	0	0	1																			
0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1											
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

QUESTION 4.

04/78/12

Question	Answer	Marks
8	1 mark for correct translator, 3 marks for explanation: – Compiler Any three from: – Does not require recompilation // compiled program can be executed without a compiler ... – ... therefore, allows faster execution – Provides an executable file ... – ... therefore, allows him to just send machine code – Dimitri's friend does not need translation/compilation software to execute the program	4

Question	Answer	Marks
9(a)	QR/Quick response	1
9(b)	Any four from: – Read/scanned using app (on mobile device) – It is the camera that is used to scan/capture the image – The three large squares are used to define the alignment // uses alignment targets/modules – Black squares reflect less light // white squares reflect more light – The app/device processes the image – Each small square/pixel is converted to a binary value	4

Question	Answer	Marks
10(a)	Any four from: – Conductive layer – An electrostatic/electric field is created – Sensor(s) (around the screen) monitor the electrostatic field – When touched (electrostatic) charge is transferred to finger – Location of touch is calculated // Co-ordinates used to calculate touch	4

Question	Answer	Marks
10(b)(i)	Any two from: – Gloves are not conductive // Gloves are an insulator – Block current/charge from finger / body / person – Stop the electrostatic field being disturbed/changed	2
10(b)(ii)	Any two from e.g. (1 mark for method, 1 for expansion): – She could use a (conductive) stylus... – ... this will allow the charge to be charged/disturbed – She could use capacitive gloves... – ... this will allow the charge to be charged/disturbed – She could use a natural language interface/voice operated interface ... – ... she could give vocal commands to the device	2

Question	Answer	Marks
11	Any six from: – Suitable sensor (motion/infra-red) – Data converted (from analogue) to digital (using ADC) – Data sent to microprocessor – Data is compared to stored value/range ... – ... if data matches/out of range data security light turned on ... – ... waits for suitable period/until no motion detected ... – ... light turned off – Continuous loop/process	6

Question	Answer	Marks
12(a)(i)	Encryption	1

QUESTION 5.

0478/13

Question	Answer				Marks
9	Statement	Assembler (✓)	Compiler (✓)	Interpreter (✓)	3
	Translates high-level language into machine code		✓	✓	
	Provides error diagnostics	✓	✓	✓	
	Translates whole program to object code in one operation	✓	✓		
	Translates and executes one line of code at a time			✓	
	1 mark for each correct column				

Question	Answer	Marks
10	Any six from: – Program counter (PC) holds address / location of the instruction – The address held in PC is sent to MAR – Address is sent using address bus – PC is incremented – The instruction is sent from address in memory to MDR – Instruction is transferred using the data bus – Instruction sent to CIR	6

QUESTION 6.

0478/12

Question	Answer	Marks
7(a)(i)	– 12 (ignore leading zeros)	1
7(a)(ii)	– 198 (ignore leading zeros)	1
7(a)(iii)	– 1217	1
7(b)	One mark per each correct hex value in correct order – 0E9	3

Question	Answer	Marks
8(a)	Any three from: – It is a universal standard – It can't be inserted the wrong way around – Supports different transmission speeds – Automatically detects if correct driver installed	3
8(b)	Two marks for benefits, one mark for drawback Benefits: – Faster speed of printing – Can print duplex / on both sides – Many letters can be printed from one toner cartridge – Can print in high volumes Drawback – Toner cartridge more expensive to buy – More time to warm-up – Larger footprint	3

QUESTION 7.

0478/13

Question	Answer	Marks
2(b)	– Input – Black – White – Sensors – Binary One mark for each correct term in the correct place	5

Question	Answer	Marks
3(a)	Any three from: – Sends request to webserver – Receives web pages back from webserver – Converts HTML to display web page – Manages protocols	3
3(b)	Any three from: – Many requests are sent from a computer – Requests are sent to the <u>webserver</u> – The webserver becomes flooded with traffic – The webserver cannot handle the requests / fails – The website can no longer be accessed – Attack maybe distributed	3

Question	Answer	Marks
4	– Serial (ignore any ref to simplex etc.) – IP (address) – Browser – MAC (address)	4

Question	Answer	Marks
5(a)	Any four from: – Stock control system has a database of stock – Each product has a (unique) barcode – Barcode is scanned, and product looked up in database – Stock levels for product are reduced (by 1) – Stock is checked against minimum level – If stock at/below minimum level an order is placed – When stock is re-ordered flag is reset	4
5(b)	– It has RAM to store the data / programs / by example currently in use – It has ROM to permanently store the boot up instructions – It has HDD to store the stock database / software / OS / by example	3
5(c)	Any four from: – MAR – MDR – PC – ALU – CU – ACC – CIR – Buses – Registers	4

QUESTION 8. Mark Scheme

Cambridge IGCSE – October/November 2015



- 9 (a) Any **one** from:
- verification is being described
 - validation is when data follows a set of rules, e.g. length/range/type check

- (b) Any **one** from:
- send as JPEG files
 - carry out a file compression first

[1]

10 (a)

w	w	w	.	c	i	e	.	o	r	g	.	u	k
%77	%77	%77	%2E	%63	%69	%65	%2E	%6F	%72	%67	%2E	%75	%6B

1 mark

1 mark

1 mark

[3]

(b)

%77	%77	%77	%2E	%72	%6F	%63	%6B	%69	%63	%74	%2E	%63	%6F	%6D
W	W	W	.	r	o	c	k	i	c	t	.	c	o	m

1 mark

1 mark

1 mark

[3]



11 1 mark for each input device + 1 mark for correct MATCHING reason for each device

Input Devices

- Barcode scanner
- ... to scan the barcode on boarding pass/mobile phone screen
- keyboard
- ... to key in data in case barcode fails to scan
- (electronic) scales
- ... weigh luggage at check-in

1 mark for each output device + 1 mark for correct MATCHING reason for each device

Output Devices

- beeper/speaker
- ... confirm barcode read/indicate error if barcode not read
- (LCD) screen
- ... select options (e.g. airline) at check-in
- printer
- ... produce bag labels

[4]

12 (a)

1	1	1	1	1	0	0	0
0	0	0	0	0	1	1	1

[2]

(b) 1 mark for error detection method and 1 mark for description

- Check sum
- ... sum of bits is transmitted and checked against the sum of the received bits
- Check digit
- ... a digit that is calculated (e.g. using modulo-11) and transmitted with the data
- ARQ
- ... when an error is detected in a packet of data a request is automatically sent for the data to be resent

[2]

QUESTION 9.

Mark Scheme

Cambridge IGCSE – October/November 2015



- 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

- (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/translate the HTML document
 - interprets/translate 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

$$(4 \times 1) + (2 \times 2) + (4 \times 3) + (1 \times 4) + (5 \times 5) + (0 \times 6) + (8 \times 7)$$

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

$$105/11 = 9 \text{ remainder } 6$$

check digit is: 6 [2]

- (ii) **1 mark**
- No/incorrect check digit

2 marks

- Total is 78
- $78/11 \dots$
- $\dots$ gives 7 remainder 1
- check digit should be 1 [3]

QUESTION 10.

Mark Scheme

Cambridge IGCSE – October/November 2015



(ii)

MAR	1	0	0	0	1	1	1	0
-----	---	---	---	---	---	---	---	---

MDR	0	1	1	1	1	0	0	1
-----	---	---	---	---	---	---	---	---

[2]

(iii)

Address	Contents
1000 0000	0110 1110
1000 0001	0101 0001
1000 0010	1000 1101
1000 0011	1000 1100
1000 1100	
1000 1101	
1000 1110	0111 1001
1000 1111	

[1]

- (b) – CIR (Current Instruction Register)
– PC (Program Counter)
– Acc (Accumulator)

[3]

- (c) – Controls operation of memory, processor and input/output
– Instructions are interpreted
– Sends signals to other components telling them “what to do”

[3]

- 4 (a) (i) Free software / open source software

[1]

(ii) Any **three** from:

- Set of principles / laws that regulate the use of computers
- Covers intellectual property rights (e.g. copying of software)
- Privacy issues (e.g. accessing personal information)
- Impact of computers on society (relevant examples can be credited)

[3]



(b) 1 mark for each CORRECT row

Statement	Firewall	Proxy server
Speeds up access of information from a web server by using a cache		✓
Filters all Internet traffic coming into and out from a user's computer, intranet or private network	✓	✓
Helps to prevent malware, including viruses, from entering a user's computer	✓	
Keeps a list of undesirable websites and IP addresses	✓	✓

[4]

(c) **one** mark for method + **one** mark for linked reason (maximum 6 marks)

- back up files...
- ...on a regular basis/to another device/to the cloud
- set data to read only...
- ...to prevent accidental editing
- save data on a regular basis...
- ...to prevent loss/corruption of data in unexpected shutdown/failure
- use correct shut down/start up procedures...
- ...to prevent damage to components/stored files
- use correct procedures before disconnecting portable storage device...
- ...to prevent damage to device/data corruption
- keep storage devices in a safe place...
- ...away from fire hazards

[6]

- 5 (a) – Memory card/SSD/HDD/magnetic tape
– Suitable description of device given

[2]

- (b) 2 hours = 120 minutes
 $120 \times 180 = 21\,600$
 $21\,600 / 1024$ (or $21\,600 / 1000$)
= **21.1 GB (or 21.6 GB)**

(1 mark for correct answer and 1 mark for correct calculation)

[2]

- 6 Any **two** from:
- facial recognition software/biometric software used to scan face
 - face image converted to digital format/data by the camera
 - digital image formed from scanned photo/biometric data stored in passport
 - key features of the face are checked/compared

[2]

QUESTION 11.

Mark Scheme

Cambridge IGCSE – October/November 2016



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]

Page 9	Mark Scheme	
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- (d) – record (layer)
– handshake (layer)

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]

QUESTION 12.

0478/11

Question	Answer	Marks
7(a)	1 mark for each correct answer: • uses several/multiple wires • transmits multiple bits at a time	2
7(b)	Benefit 1 mark for: • quicker/faster data transfer Drawback One from: • More chance of data being skewed due to bits being sent simultaneously/out of order // less safe transmission as bits are sent simultaneously/out of order • More expensive as requires more/several/multiple wires • More chance of interference as more/several/multiple wires are used (than can create crosstalk)	2
7(c)	One from: • Used in integrated circuits • Used in RAM • Used in connections to peripheral devices (e.g. printer)	1

Question	Answer	Marks
8	1 mark for each correct answer, in the given order: • browser • webpages • Internet Service Provider (ISP) • Internet • protocol • IP address	6

PUBLISHED

Question	Answer	Marks
9	Five from: • The data is sent to the microprocessor • The analogue data is converted to digital (using ADC) • The microprocessor compares the data to a stored value of 5 kg ... – ... If the value is greater than 5 kg ... – ... a counter is added to/incremented • The process is continuous	5

Question	Answer	Marks
10	Four from: • It performs a number of basic tasks, including controlling hardware/file handling (any other suitable examples) • It allows the user to communicate with the computer using hardware // without it the user would not be able to communicate with the computer using hardware • It provides the user with a user interface // without it the user would not have a user interface to use • PC's are often used to perform many complex tasks at a time ... – ... the OS is needed to handle this multitasking – ... therefore, it provides the ability to handle interrupts	4

Question	Answer	Marks
7	1 mark for each correct line (to a maximum of 5) Browser Internet Service Provider (ISP) Hypertext Transfer Protocol (HTTP) Uniform Resource Locator (URL) MAC address IP address A program that allows a user to view webpages The main protocol that governs the transmission of data using the Internet The website address that is typed into the address bar An address given to each device on a network. It is provided by the network A unique address given to a device on a network. It is provided by the manufacturer A company that provides a connection to access the Internet	5

Question	Answer	Marks
8	Four from: - Used to attend to certain tasks/issues - Used to make sure that vital tasks are dealt with immediately - The interrupt/signal tells the CPU/processor (that its attention is required) - A signal that can be sent from a device (attached to the computer) - A signal that can be sent from software (installed on the computer) - The interrupt will cause the OS/current process to pause - The OS/CPU/ISR will service/handle the interrupt - They have different levels of priority - After the interrupt is serviced, the (previous) process is continued - It enables multi-tasking to be carried out on a computer - A valid example of an interrupt e.g. 'out of paper' message for a printer	4

Question	Answer	Marks
9(a)(i)	Two from: - Data is transmitted one bit at a time - Data is transmitted using a single wire - Bits arrive in order/sequence	2
9(a)(ii)	Two from: - Data is transmitted multiple bits at a time/simultaneously - Data is transmitted using multiple wires - Bits may arrive out of sequence/skewed (and are reordered)	2
9(a)(iii)	1 mark for each: - Data is transmitted in both directions ... at the same time/simultaneously	2

Question	Answer	Marks
10(b)	1 mark per correct gate with correct inputs.	6

Question	Answer	Marks
11(a)	• Holds address of next/current instruction ... • ... to be fetched/processed/executed	2
11(b)	• Stores data/instruction that is in use ... • ... from address in MAR	2

Question	Answer	Marks
12	Four from (Max three from each): MP3 • Digital recording of sound • Produced by recording software / microphone • Used when distributing sound files • Compressed file format MIDI • Instructions of how to make sound • Non-audio recording • File created using digital musical instruments • Produced by synthesizer • Used when composing music • Individual notes/instruments can be changed	4

Question	Answer	Marks
13(a)	1 mark for storage, 1 mark for justification • External/Removable HDD // External/Removable SSD // Large capacity USB Flash Drive • Backups must be stored separately • Will hold sufficient data • Faster write abilities (SSD/USB drive only)	2

Question	Answer	Marks																																				
5	One mark for each correct parity bit <table><tr><td></td><td>Parity bit</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Register A</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>Register B</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td>Register C</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr></table>		Parity bit								Register A	0	0	1	0	0	0	1	1	Register B	0	0	0	0	0	1	1	1	Register C	0	0	0	0	0	0	1	1	3
	Parity bit																																					
Register A	0	0	1	0	0	0	1	1																														
Register B	0	0	0	0	0	1	1	1																														
Register C	0	0	0	0	0	0	1	1																														

Question	Answer	Marks
6(a)	• Free software	1
6(b)	• Freeware	1
6(c)	• Shareware	1
6(d)	• Plagiarism // Intellectual property theft	1
6(e)	• Copyright	1