

QUESTION 1.

PUBLISHED



Question	Answer
11	Three from e.g. : • (Provides an) interface • Loads / opens / installs / closes software • Manages the hardware // manages peripherals // spooling • Manages the transfer of programs into and out of memory • Divides processing time // processor management • Manages file handling • Manages error handling // manages interrupts • Manages security software • Manages utility software • Manages user accounts • Multitasking • Multiprogramming // time slicing • Batch processing

Question	Answer	Marks
12(a)	1 mark for appropriate sensor and 1 further mark for appropriate use. Two from: • Gas (sensor) ... • ... e.g. to measure the levels of oxygen/carbon dioxide / nitrogen in the factory to make sure they are not too high / low • Temperature (sensor) ... • ... e.g. to measure the temperature of the chemicals to make sure it is not too high/low • Motion / Infra-red (sensor) ... • ... e.g. to detect any persons in an unauthorised area of the factory • Pressure (sensor) ... • ... e.g. to measure the pressure of chemicals flowing through pipes to check that level are not too high / low • pH (sensor) ... • ... to measure the pH to make sure the acidity / alkalinity of the chemicals is correct • Light (sensor) ... • ... to measure the level of light to make sure it remains at a constant level for the chemical process	4
12(b)	Five from: • Sensors send signals to microprocessor • Analogue signals are <u>converted to digital</u> (using ADC) • Microprocessor compares value to stored value ... • ... If out of range / matches stored values ... • ... signal sent to alert workers (e.g. sound alarm) • ... microprocessor send signal to cause an action to occur e.g. cool a process down, heat a process up, add a chemical • ... no action taken • Output/record readings • Monitoring is continuous	5



Question	Answer	
13(a)	Two from: • Smaller file to transmit • The file is transmitted quicker • Uses / requires less bandwidth	
13(b)(i)	• Lossless (compression) ... • ... It is important the code must be (exactly) the same as the original file • ... If it does not match the original file it will not work	3
13(b)(ii)	• Lossy (compression) ... • ... It would make the file smaller than lossless compression / the file would stream faster than lossless compression • ... The quality of the video can be reduced but it can still be viewed	3

QUESTION 2.



Question	Answer																																				
10(a)	1 mark for each correct gate, with the correct input(s) <pre>graph LR; A --- AND1[AND]; B --- AND1; B --- AND2[AND]; C --- NOT1[NOT]; NOT1 --- AND2; AND1 --- OR[OR]; AND2 --- OR; OR --- X</pre>																																				
10(b)	<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><tr><td>0</td><td>1</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>1</td><td>0</td></tr><tr><td>1</td><td>1</td><td>0</td><td>1</td></tr><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	A	B	C	X	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	0	1	0	0	0	1	0	1	0	1	1	0	1	1	1	1	1
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Question	Answer
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)

QUESTION 3.

0478/13

Question	Answer			Marks
10	1 mark for each correct tick			6
	Statement	true (✓)	false (✓)	
	Assembly language uses mnemonic codes.	✓		
	Assembly language programs do not need a translator to be executed.		✓	
	Assembly language is a low-level programming language.	✓		
	Assembly language is specific to the computer hardware.	✓		
	Assembly language is machine code.		✓	
	Assembly language is often used to create drivers for hardware.	✓		

QUESTION 4.

0478/11

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
9(b)	Maximum of three marks per error detection method. 1 mark for naming the method, 2 marks for describing it. Parity (check) • Odd or even parity can be used • Bits are added together // 1 bits are counted • Parity bit added (depending on parity set) • Parity checked on receipt • If parity bit is incorrect an error is detected Checksum • Calculation performed on data (to get the checksum) • Checksum sent with data • Checksum recalculated after transmission • Comparison made between checksum before and checksum after transmission • Error detected if checksums are different Automatic repeat request (ARQ) • Uses acknowledgement and timeout • Request is sent (with data) requiring acknowledgement • If no response/acknowledgment within certain time frame data package is resent • When data received contains an error a request is sent (automatically) to resend the data • The resend request is repeatedly sent until packet is received error free/limit is reached/acknowledgement received	9

Question	Answer	Marks
10	Five from: • The sensor sends data to the microprocessor • The analogue data is converted to digital (using ADC) • The microprocessor compares the reading to the set range/stored values/stored data (6 to 8) ... – ... If the reading is >8 or <6 / outside range ... ○ ... the microprocessor sends a signal to output the alert • The process is continuous/repeated	5

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
13(b)	1 mark for storage, 1 mark for justification • SSD // SD card // Flash memory • Small physical size • Lightweight • Low heat production • Low power consumption • It's quiet • Fast read/write times	2
13(c)	1 mark for storage, 1 mark for justification • DVD // Blu-ray // USB Flash Drive // SD card • Easy to distribute • Small in size • Cheap to buy • Universal storage therefore compatible with many devices	2

Question	Answer	Marks
11(a)	RAM • To store the data / instructions / parts of OS that are currently in use ROM • To store the firmware / bootup instructions / BIOS SSD • To store files / software // by example	3
11(b)	Two from: • It is more durable // it has no moving parts • It has a faster read / write / access speed • It is more compact / light weight / smaller / portable • It uses less energy // battery will last longer • It is quieter • Not affected by magnetic forces • It runs at a cooler temperature • Less latency // takes less time to warm up	2

Question	Answer	Marks
7(a)(i)	Three from: • RAM • Primary memory • Volatile memory • Holds currently in use data/instructions • Directly accessed by the CPU	3
7(a)(ii)	Two from: • Arithmetic and logic unit (ALU) • Memory address register (MAR) • Memory data register (MDR) // Memory buffer register (MBR) • Accumulator (ACC) • Immediate Access Store (IAS) • Control Unit (CU) • Program counter (PC) • Current instruction register (CIR) • Address bus • Data bus • Control bus • Input device • Output device • Secondary storage device	2

Question	Answer	Marks																		
7(b)	One mark for each correct row <table> <tr> <th>Statement</th><th>True (✓)</th><th>False (✓)</th></tr> <tr> <td>Interrupts can be hardware based or software based</td><td>✓</td><td></td></tr> <tr> <td>Interrupts are handled by the operating system</td><td>✓</td><td></td></tr> <tr> <td>Interrupts allow a computer to multitask</td><td>✓</td><td></td></tr> <tr> <td>Interrupts work out which program to give priority to</td><td></td><td>✓</td></tr> <tr> <td>Interrupts are vital to a computer and it cannot function without them</td><td>✓</td><td></td></tr> </table>	Statement	True (✓)	False (✓)	Interrupts can be hardware based or software based	✓		Interrupts are handled by the operating system	✓		Interrupts allow a computer to multitask	✓		Interrupts work out which program to give priority to		✓	Interrupts are vital to a computer and it cannot function without them	✓		5
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Interrupts can be hardware based or software based	✓																			
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Interrupts work out which program to give priority to		✓																		
Interrupts are vital to a computer and it cannot function without them	✓																			

Question	Answer	Marks
8	Four from: • A hacker could have hacked the network ... • ... and downloaded the malware onto the network • Clicking a link/attachment/downloaded a file from an email/on a webpage ... • ... the malware could have been embedded into the link/attachment/file • Opening an infected software package ... • ... this would trigger the malware to download onto the network • Inserting an infected portable storage device ... • ... when the drive is accessed the malware is downloaded to the network • Firewall has been turned off ... • ... so malware would not be detected/checked for when entering network • Anti-malware has been turned off ... • ... so malware is not detected/checked for when files are downloaded	4