

QUESTION 1.



Question	Answer		
6(a)(i)	Control system		
6(a)(ii)	Use of actuators means that the system is controlling		
6(b)	System wastes processor time checking for values that are not changing Some sensor input needs to be acted upon immediately	1 1	2
6(c)(i)	Interrupts need to be disabled so that the process of dealing with an interrupt is itself not interrupted		1
6(c)(ii)	After handling the interrupt interrupts need to be enabled so that further interrupts can be dealt with		1
6(c)(iii)	Content of <u>registers</u> Placed on stack	1 1	2
6(c)(iv)	Changing sensor value dealt with as soon as it happens Processor needs to check sensor only when an <u>interrupt occurs</u>	1 1	2
6(c)(v)	AND #B00000001000000000 // AND #&0200 // AND #512 Op code Operand	1 1	2

QUESTION 2.



Question	Answer	
6(a)	1 mark per bullet point (max 3) - To ensure that the system operates within the given criteria - By enabling system output to affect subsequent system inputs - Thus enabling the system to <u>automatically</u> adjust conditions - Suitable example of feedback	
6(b)	1 mark per bullet point - Sensors <u>continually</u> measure the temperature of the <u>water</u> in the swimming pool - The (stream of) readings are sent to a processor and compared with 28 degrees - If the reading is out of range (by a system set amount) then actuators turn the heater/cooler on or off as necessary - Feedback ensures that the water temperature remains close to 28 degrees	4
6(c)	1 mark for example of monitoring system, max 2 for explanation - Suitable example identified - Use of data captured - No feedback as there is no output that could change the system environment For example: - Monitoring the rainfall - The amount of rainfall collected over a specific time is measured - There is no output to change the level of rainfall or - Security camera - Sending pictures to control room - No changes made to environment by system	3

QUESTION 3.



Question	Answer	
5(a)	1 mark per bullet point to max 2 - Monitoring only gathers information but control systems also perform actions - Output in a control system can affect the input - There is no feedback in a monitoring system // a control system relies on feedback - Example of monitoring applied to the weather station	
5(b)(i)	1 mark per bullet point to max 2 - So the readings are stored in chronological order - Easy to add / append each new reading to the end of the file // no further processing is required - Allows the readings to be read in the order that they were taken - Readings do not need to be given further identification as to date / time // no key field needs to be added	2
5(b)(ii)	1 mark per bullet point max 2 - Earliest temperature reading is accessed first - and each successive temperature reading is read (in date / time order) - until the final reading has been accessed	2
5(b)(iii)	1 mark for Random 1 mark per bullet point for description to max 3 - Record locations are calculated ... using a hashing algorithm on a key field - If a record cannot be stored / found at that location ... then subsequent locations are searched // closed hash ... or an overflow area is searched // open hash	4

Question	Answer	Marks