

Chapter # 3 – Monitoring and Control

June 2017 – P11 & P12

- 7 A school has a computerised weather station which monitors a number of atmospheric conditions or variables.

Describe how data is collected, processed and displayed using such a system.

Answer:

7	<p>Six from:</p> <p>Sensors are used to feed data back to a computer</p> <p>Naming of physical variables and the sensors/devices used to gather data</p> <p>Analogue data is converted into digital for the computer to process using an analogue to digital converter</p> <p>Computer stores readings in a table ready for processing</p> <p>Computer plots graphs automatically</p> <p>Computer calculates minimum and maximum temperature/rainfall/wind speed/atmospheric pressure for the day/month/year so far</p> <p>Computer outputs the <u>results/graphs</u> on screen/printer.</p>	6
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November 2017 – P13

- 8 Many people complain about the number of CCTV cameras there are in public places.

Discuss the benefits and drawbacks of CCTV monitoring in public places such as on streets or inside shops.

Answer:

8	<p><i>Eight from:</i></p> <p><i>Benefits:</i> If CCTV cameras constantly monitor a retail business, criminals will likely seek an easier target/may not commit the crime If employees know that they are constantly being watched, they are less likely to steal from their employer or waste time on the job If a crime occurs in an establishment that has installed CCTV surveillance, investigation will be aided by the recorded video/can be used as evidence in court cases If an argument occurs between two employees, the employer can examine the videotape to determine what actually occurred CCTV can help settle disputes when a customer has a complaint cameras are effective in apportioning blame</p> <p><i>Drawbacks:</i> CCTV is usually not able to display every bit of an area Some people object to the invasion of privacy due to constant video monitoring Employees under constant surveillance by CCTV cameras often dislike monitoring of their daily behaviour The cameras can sometimes be thwarted by covering them up Someone who is familiar with the property may still be able to avoid being caught on camera Hackers can get into the system and control which ways the cameras are pointing while their comrades in crime do the crime.</p> <p><i>Must have no more than 6 from each section.</i> <i>One mark is available for a reasoned conclusion.</i></p>	8
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June 2018 – P11

- 11 Control technologies are affecting everybody in their normal way of life. Some people think this is good; others disagree with this.

Evaluate the use of control technologies in everyday life.

Answer:

11	<p>This question to be marked as levels of response:</p> <p>Level 3 (7–8 marks) Candidates will explain the advantages and disadvantages of control technologies using relevant and appropriate examples. The information will be relevant, clear, organised and presented in a structured and coherent format. There may be a reasoned conclusion/opinion. Specialist terms will be used correctly and appropriately.</p> <p>Level 2 (4–6 marks) Candidates will explain the advantages and disadvantages of more than one control technology. Examples used will be for the most part relevant. For the most part, the information will be relevant and presented in a structured and coherent format. There may be a conclusion/opinion. Specialist terms will be used appropriately and for the most part correctly.</p> <p>Level 1 (1–3 marks) Candidates will only address some aspects of the use of control technology and either advantages or disadvantages. Examples, if used, may lack relevance. There will be little or no use of specialist terms.</p> <p>Level 0 (0 marks) Response with no valid content.</p>	8
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Question 11**Answer (Continued):**

Candidates may refer to e.g.:

Computer controlled production lines using robots instead of humans has increased unemployment

Computer-controlled printing presses have replaced many print workers

IT Technicians are needed to maintain computers and robots increasing employment

Programmers are needed to program computers and robots

However, number of new jobs is far less than old jobs lost

Microprocessor-controlled devices in the home allow people to have more leisure /free time instead of doing household work

Burglar alarms give people a greater sense of security

Can lead to people becoming lazy/over reliant on microprocessor-controlled devices in the home

There has been a loss of manual household skills due to increase in use of microprocessor-controlled devices in the home

Traffic lights – fewer traffic jams than manually controlled

Street lights – more economical – only come on when needed

Air conditioning units in shopping malls make shopping a more comfortable experience...

...but increases costs for stores...

...and therefore prices to the customer.

June 2018 – 12

- 5 Computer controlled traffic lights are used to control traffic flow in major cities.

Identify **three** input devices which could be used and describe their use in such a system.

Answer:

5	<p>Three matched pairs <i>from</i>:</p> <p>Induction loop When a vehicle goes over it sends a <u>signal to the computer</u> that a vehicle has passed</p> <p>Sound sensor In kerb stones constantly feeding <u>back to computer</u> sound level – if noise above preset value computer registers that a vehicle has passed</p> <p>(Video/Digital) camera Above traffic lights and registers car approaching and sends a signal <u>to the computer</u></p> <p>Push buttons When a pedestrian presses the button, a signal <u>goes to computer</u> to register pedestrian is waiting to cross.</p>	6
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- 11 Many major supermarkets now use a variety of monitoring technologies to check the work of their employees.

Evaluate the use of technology to monitor employees in the workplace.

Answer:

11	<p>To be marked as a level of response:</p> <p>Level 3 (7–8 marks) Candidates will describe the benefits and drawbacks of monitoring for both employer and employee. The issues raised will be justified. The information will be relevant, clear, organised and presented in a structured and coherent format. Specialist terms will be used accurately and appropriately.</p> <p>Level 2 (4–6 marks) Candidates will describe the benefits and drawbacks of monitoring for both employer and employee although development of some of the points will be limited to employer/employee. For the most part the information will be relevant and presented in a structured and coherent format. Specialist terms will be used appropriately and for the most part correctly.</p> <p>Level 1 (1–3 marks) Candidates may only address one side of the argument, and give basic benefits/drawbacks. Answers may be simplistic with little or no relevance. There will be little or no use of specialist terms.</p> <p>Level 0 (0 marks) Response with no valid content.</p>	8
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Question 11**Answer (Continued):**

11	<p>Candidates may refer to e.g.:</p> <p>Employer benefits:</p> <p>Employers can keep track of the amount of time an employee spends away from the computer or idle time at the terminal</p> <p>Video monitoring can deter theft thus maintaining security</p> <p>Video monitoring can monitor employee productivity/work is up to standard/employees are working efficiently</p> <p>Provides an opportunity to watch for mistakes and errors throughout the workday to help an employee cut down on his mistakes in the future by pointing out ways he can improve</p> <p>Use Global Positioning Systems (GPS) devices to track employees in employer-owned vehicles</p> <p>If employees understand that the monitoring system is not being used solely to point out weaknesses, they may become more accepting of being monitored</p> <p>Can have video monitoring to catch all safety issues and so able to bring safety issues to the forefront</p> <p>Catching blatant disregard for safety on video may also save employer from potential lawsuits</p> <p>Can catch those who willingly violate company policy and immediately employ disciplinary action</p> <p>Can increase productivity if employees know they are being monitored</p> <p>Software can also be used to monitor or track employee activity and productivity...</p> <p>...ensuring data is secure by using the software to block certain websites</p> <p>With a GPS device, dispatchers can give drivers very specific driving directions to a location saving time and money for fuel</p> <p>If dispatchers know where every van is they can dispatch the one closest to a particular job</p> <p>By tracking which drivers are exceeding the speed limit companies can educate those drivers about the result of speeding, and discipline them as necessary</p> <p>Vehicle fleet managers can also improve efficiency by tracking and eliminating employees' unauthorised breaks</p>	
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Question 11**Answer (Continued):**

11	<p>Employer drawbacks:</p> <p>Software is expensive to purchase System is expensive to set up Can lend itself to lawsuits for infringement of privacy Can make employees resentful (and less productive) of infringement of privacy Mistrust of their employer leads some workers to leave and thus creates increased turnover of employees</p> <p>Employee benefits:</p> <p>A company may also use video monitoring in a parking garage as a security measure for employee safety Provides employer with detailed snapshots of how an employee is going above and beyond the call of duty and can acknowledge employee excellence</p> <p>Employee drawbacks:</p> <p>Most computer monitoring equipment allows employers to monitor without the employees' knowledge... ...although some employers do notify employees that monitoring takes place Messages sent within the company as well as those that are sent to another company or from another company to employee can be subject to monitoring by employer.</p>	
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June 2019 – P11

- 10** A car park has a barrier which operates automatically. It opens when a car approaches it and closes when the car is clear of the barrier.

Describe, including the use of sensors, how a microprocessor controls this operation.

Answer:

10	<p>Four from:</p> <p>Induction loop / pressure sensor... ...sends signal/data to microprocessor Analogue to digital converter changes the analogue input to digital for the microprocessor to process Microprocessor compares reading with pre-set value If pressure is greater than/if inductance is different to preset value Microprocessor sends a signal to an actuator... ...which raises the barrier Light sensor detects the break in the beam of light When the beam of light resumes the microprocessor sends a signal to an actuator... ...which lowers the barrier</p>	4
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June 2019 – P12

- 3 People in a village are aware that the local river is being polluted. They are concerned that this is being caused by a nearby factory.

Describe how computers and sensors could be used to monitor the level of pollution in the river in order to determine whether the factory is responsible for the pollution.

Answer:

3	<p>Five from:</p> <p>Place sensors upstream and downstream from the factory</p> <p>Temperature / light / turbidity sensors would be connected to computer</p> <p>(Analogue) data is converted into digital using an analogue to digital converter / ADC</p> <p>Conversion / use of ADC enables the computer to understand the data</p> <p>Computer receives data from sensors / ADC</p> <p>Readings from above the factory are compared with those from below the factory <u>by the computer</u></p> <p>Differences / results are printed out / displayed on screen</p> <p>Graphs are <u>automatically</u> produced by the computer showing values from below and above the factory</p> <p>Computer stores readings in a table ready for processing.</p>	5
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June 2019 – P13

- 2 Tick the **four** most accurate statements regarding control and monitoring systems and the use of sensors.

	✓
A temperature sensor is able to directly control the temperature of water in a washing machine	
A pressure sensor is often used to monitor the amount of pollution in a river	
A moisture sensor is used to monitor the pollution in a river	
A humidity sensor is often used in a computerised weather station	
Microprocessors are unable to directly read the analogue data produced by a sensor	
In order to control physical variables, microprocessors send signals to actuators to take action	
Passive sensors produce both input and output	
A weather station is an example of a control system	
An air conditioning system is an example of a control system where the output affects the input	
Monitoring systems never need sensors to input data	

[4]

Question 2**Answer:**

2	A temperature sensor is able to directly control the temperature of water in a washing machine		4
	A pressure sensor is often used to monitor the amount of pollution in a river		
	A moisture sensor is used to monitor the pollution in a river		
	A humidity sensor is often used in a computerised weather station	✓	
	Microprocessors are unable to directly read the analogue data produced by a sensor	✓	
	In order to control physical variables, microprocessors send signals to actuators to take action	✓	
	Passive sensors produce both input and output		
	A weather station is an example of a control system		
	An air conditioning system is an example of a control system where the output affects the input	✓	
	Monitoring systems never need sensors to input data		