

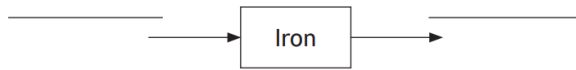
# The Systems Approach Past Paper Problems

2019 Q1

1. An iron is shown.



- a) Complete the system diagram below by stating the main input energy and the main output energy for the iron. 2



The iron uses feedback to monitor the output.

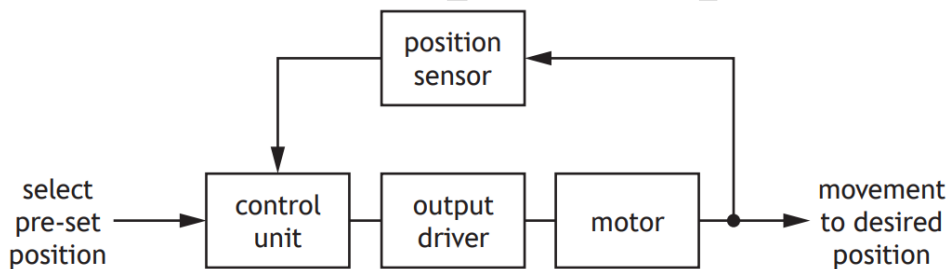
- b) State the type of control that uses feedback. 1

2019 Q9

2. The angle of a hospital bed can be changed to a pre-set position as shown.



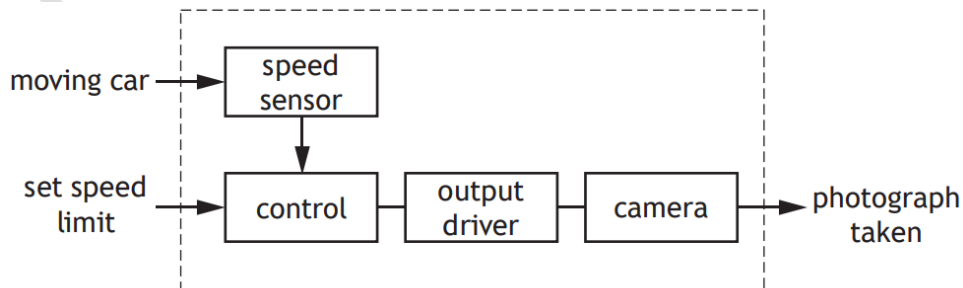
An incomplete sub-system diagram for the control of the bed movement is shown.



- a) Complete the sub-system diagram above by adding the system boundary. 1  
 b) Describe, with reference to the sub-system diagram, the control of the bed movement. 3  
 Your explanation should start with the phrase  
*The pre-set position is selected . . .*

2018 Q4

3. A motorway speed camera is designed to photograph any car that is being driven above a set speed limit. The sub-system diagram used to represent the control of the motorway speed camera is shown.

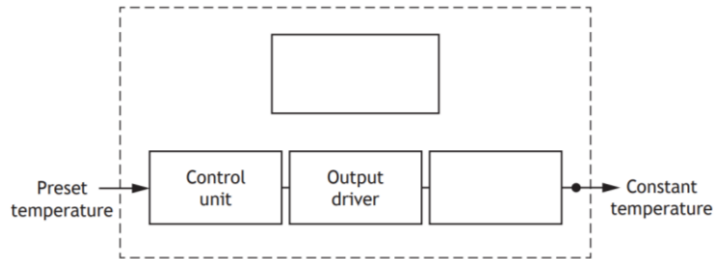


- a) State the type of control shown in this sub-system diagram. 1  
 b) Describe the operation of the motorway speed camera. 3

2018 Q17c

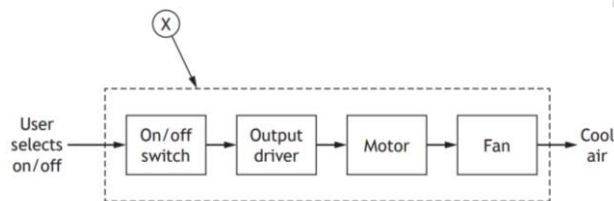
4. The grilling machine uses feedback to maintain a constant temperature.
- i. State the type of control that uses feedback.
  - ii. Complete the sub-system diagram below for the grilling machine.

1  
3



2017 Q1.

5. A sub-system diagram for a hand held fan is shown below.

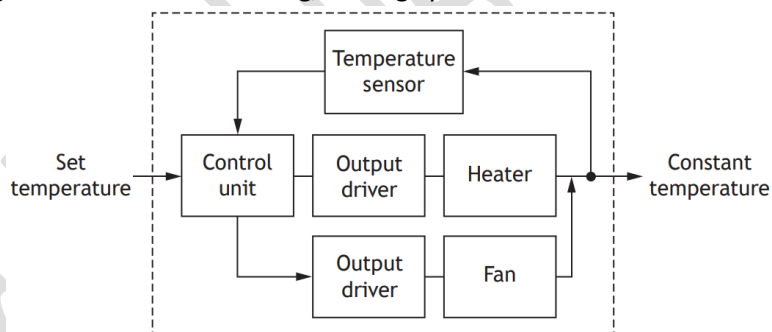


- a) State the type of control used in this system.
- b) State the name of X .

1  
1

2017 Q13c

6. A sub-system diagram for the café's heating/cooling system is shown below.



Describe the control of the system.  
Start with the phrase  
*The user sets the required temperature...*

4

2016 Q1

7. An automatic vacuum cleaner uses a proximity sensor to detect when it is getting close to walls or furniture. It will then move to avoid them. The vacuum cleaner uses closed loop control.



Describe what is meant by closed loop control.

1

8. Describe two advantages of a microcontroller based control system compared to a hard-wired electronic circuit. 2

**2016** Q11

9. 3D printers allow individual users to quickly manufacture complex products from a computer model.

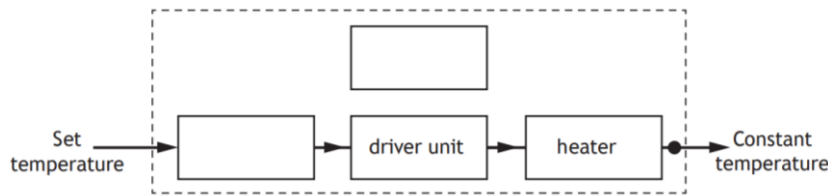
a) 1

i. Describe a positive economic impact of a 3D printer. 1

ii. Describe a negative economic impact of a 3D printer. 1

3D products are printed onto a heated platform. The platform is required to maintain a set temperature during the printing process.

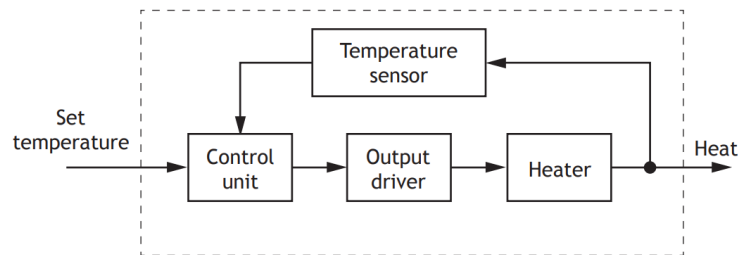
b) Complete the sub-system diagram below for the platform temperature. 3



c) Describe how feedback is used to maintain the platform's temperature. 2

**2015** Q3

10. A diagram for a heating system is shown below.

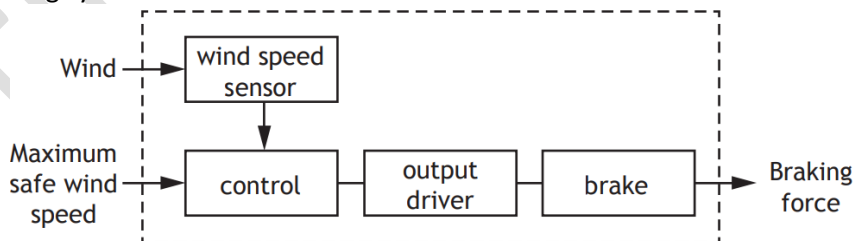


a) State the name of this type of diagram. 1

b) State the function of the output driver. 1

**2015** Q10c

11. A wind turbine can only be used when the wind speed is below a maximum safe level. A diagram for part of the braking system is shown below.



Describe, using appropriate terminology, the operation of the wind turbine braking system. 3

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