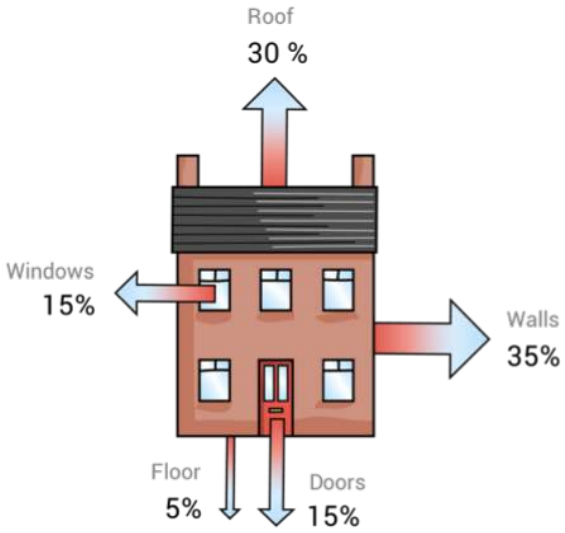
0 1

Typical heat losses from a particular **detached** house are as shown in the below diagram.



0 1 . 1

On a given day, 7 MJ of heat energy is lost through its **walls**. Calculate the **total** amount of energy which is transferred from the house to its surroundings on this day.

Answer = _____ MJ

[2 marks]

0 1 . 2

Write down **two** factors which affect the rate at which thermal energy is lost through the walls of a house.

_____

_____

[2 marks]

0 1 . 3

A nearby **terraced** house is the same size as the above detached house, and has been built using the same materials. Explain why the amount of heat lost from the **walls** of the terraced house is likely to be **lower** than that from those of the above detached house.

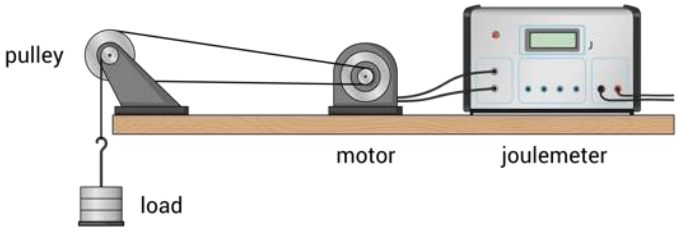
_____

_____

[2 marks]

0 2

Caren is using the below experimental setup to investigate the efficiency of an electric motor.



0 2 . 1 When a 4 N load is lifted through a distance of 50 cm, the reading on the joulemeter increases by 6.5 J. Calculate the efficiency of the motor in lifting this load.

Efficiency = _____ %

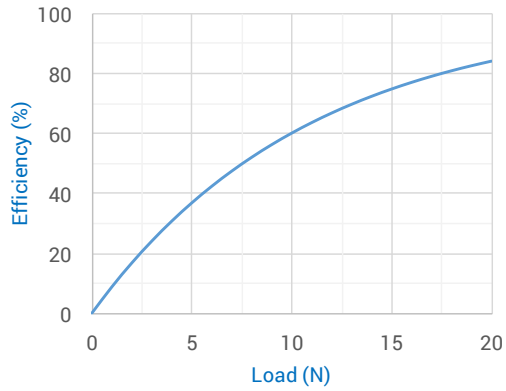
[3 marks]

0 2 . 2 Caren goes on to investigate how the efficiency of the motor depends on the size of the load. Write down **one** variable which she should **control** in this investigation.

_____

[1 mark]

0 2 . 3 The results which she obtains are as shown below.



Describe the trend shown by the above graph.

_____

[2 marks]

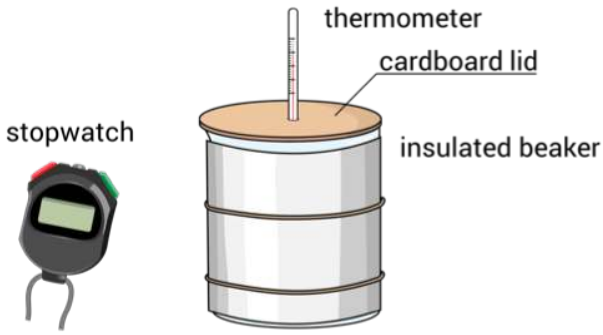
0 2 . 4 If 8 J of electrical energy is supplied to the motor to enable it to lift a load of 10 N, through what distance will the load be lifted?

Distance = _____ m

[3 marks]

0 3

Mikaela uses the below experimental setup to investigate the effectiveness of a number of different materials as thermal insulators.



The results which she obtains are as shown in the below table.

Material	Temperature decrease of water (°C)		
	1st run	2nd run	Average
Aluminium foil	5	7	
White card	20	23	
Bubble wrap	4	4	
Corrugated card	14	10	
Black sugar paper	30	26	

0 3 . 1

Write down the steps which she should have followed to obtain this data.

[4 marks]

0 3 . 2

State two **control variables** in this experiment.

[2 marks]

0 3 . 3

Complete the final column in the above table

[2 marks]

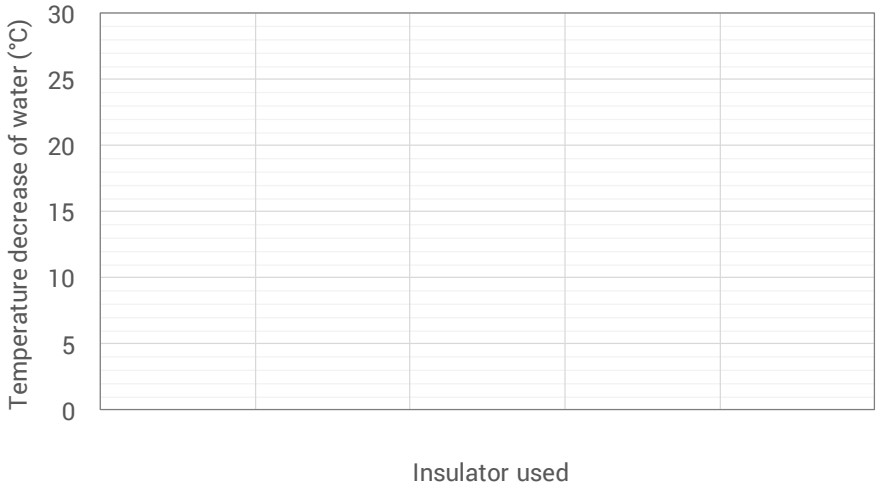
0 3 . 4 Write down one **safety precaution** which Mikaela should have taken in carrying out this experiment.

[1 mark]

0 3 . 5 Explain why Mikaela **repeated** each measurement.

[1 mark]

0 3 . 6 Using the below axes, plot a suitable graph of the results of this experiment.



[6 marks]

0 3 . 7 Which of the insulators used had the **highest** thermal conductivity?

[1 mark]