

8I Heating and cooling

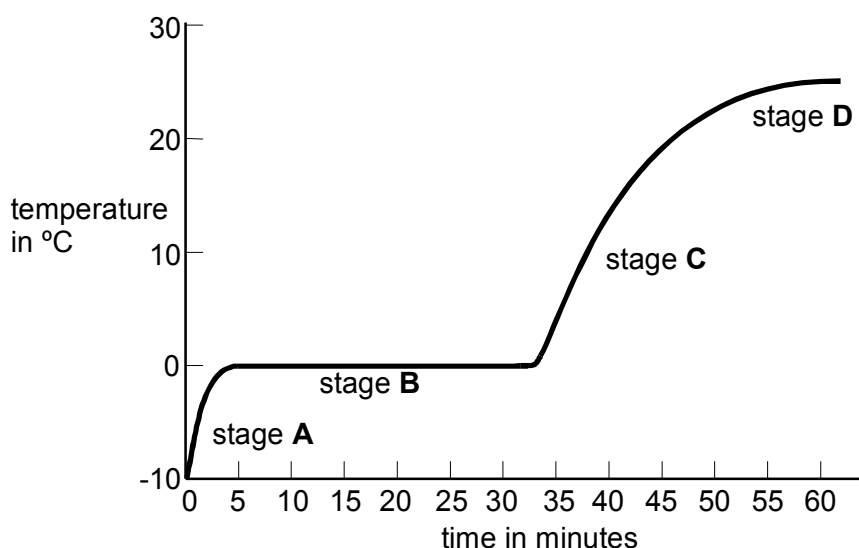
Assessment for learning...year 8 (level 3-6)

Answer all questions:

Total marks	28
Time allowed	25 mins.

Question 1:

A test tube of crushed ice is taken out of a freezer and left in a warm room. The graph shows how the temperature in the test tube changes.



(a) What is happening to the ice at stage B?

.....

1 mark

(b) Why does the temperature of the water stop rising at 23°C (stage **D**)?

.....
.....

1 mark

(c) Four descriptions of the ways molecules could move are given below.

They vibrate around fixed points.

They move past each other and are close together.

They move in straight lines, colliding occasionally.

They all move in the same direction at the same speed.

(i) How do the molecules move at stage **A**?

Write **A** in the correct box above.

1 mark

(ii) How do the molecules move at stage **C**?

Write **C** in the correct box above.

1 mark

(d) Ice from a freezer is put in a glass of water at room temperature. The ice floats in the water.

(i) What does this show about the density of the ice compared to that of water?

Tick the correct box.

Ice is more dense than water.

Ice and water have the same density.

Ice is less dense than water.

Ice has a density of zero.

1 mark

(ii) The fact that ice floats in water tells us something about the distances between the molecules.

Tick the box by the correct statement.

The molecules are further apart in ice than in water.

The molecules are the same distance apart in ice and in water.

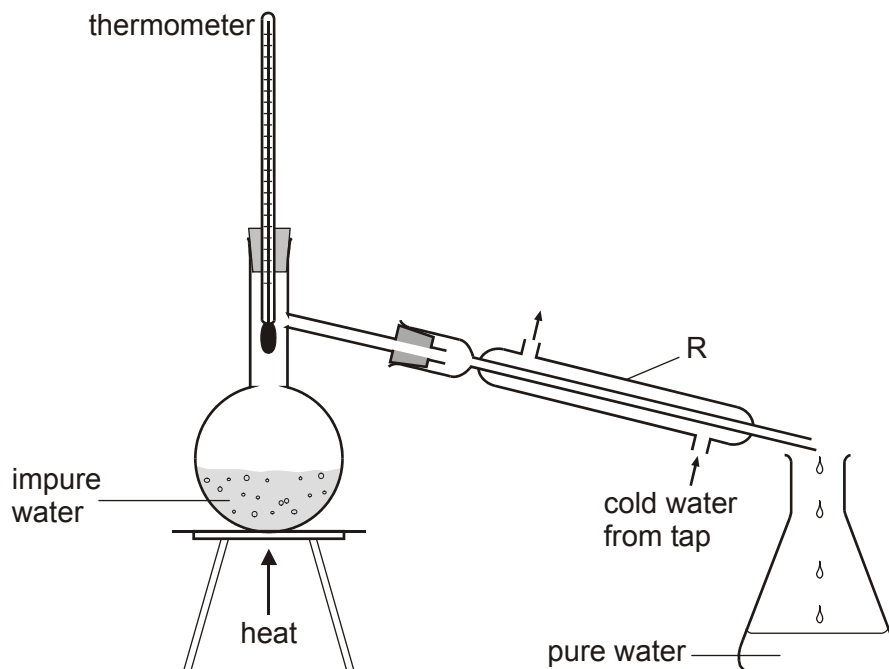
The molecules are closer together in ice than in water.

1 mark

Maximum 6 marks

Question 2:

(a) The apparatus in the diagram below is used to obtain pure water from impure water.



(i) What temperature would the thermometer show?

..... °C

1 mark

(ii) What is the function of the piece of apparatus labelled R?

.....

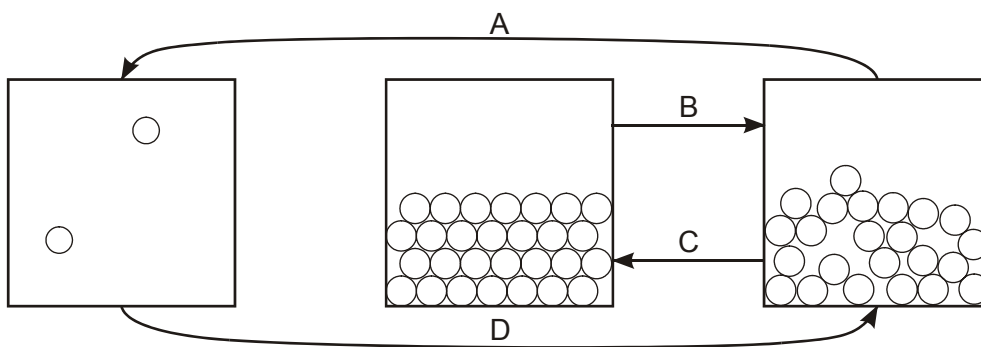
1 mark

(iii) Give the name of the process which purifies water in this way.

.....

1 mark

(b) The diagram below shows particles in a gas, a solid and a liquid. Each arrow, A, B, C and D, represents a change of state.



(i) Choose from the following words to complete the sentences below.

- Boiling condensing distilling evaporating**
Filtering freezing melting

Change of state A is called

Change of state B is called

Change of state C is called

Change of state D is called

4 marks

(ii) Look back to the apparatus in part (a).

Give the letter, A, B, C or D, from the diagram above, for the change of state which occurs:

in the round-bottomed flask

in the piece of apparatus labelled R.

2 marks

Maximum 9 marks

Question 3:

A pupil has two well-insulated containers of water at 20° C. She takes two identical blocks of aluminium, both at 100° C, and puts one into container A and the other into container B. The temperature of the water rises in each container until it reaches a steady value. Her results are shown in the table.

container	temperature of water in °C at the start	temperature of block in °C at the start	volume of water in cm ³	final temperature of water in °C
A	20	100	500	44
B	20	100	1000	34

(a) Explain why the final temperature of the water is lower in container B.

.....
.....

1 mark

(b) What is the final temperature of each aluminium block?

The block in container A is at ° C.

The block in container B is at ° C.

1 mark

(c) Which of the identical aluminium blocks transferred more energy to the water?

Explain your reasoning.

.....
.....

1 mark

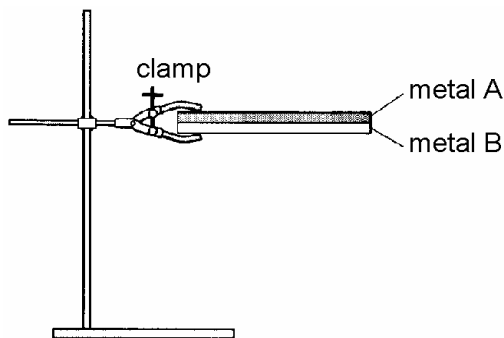
Maximum 3 marks

Question 4:

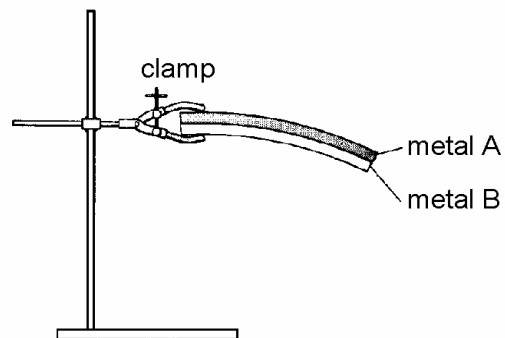
The temperature of four different metal strips, each one metre long, was increased by 10°C . The information below shows the increase in length of each of the metal strips. Use the information to answer the questions.

metal strip	increase in length in mm
aluminium	0.25
brass	0.19
iron	0.12
steel	0.11

(a) A bimetallic strip is made of two metal strips fixed together. The two metals expand by different amounts when heated. This causes the strip to bend as shown below.



bimetallic strip before heating



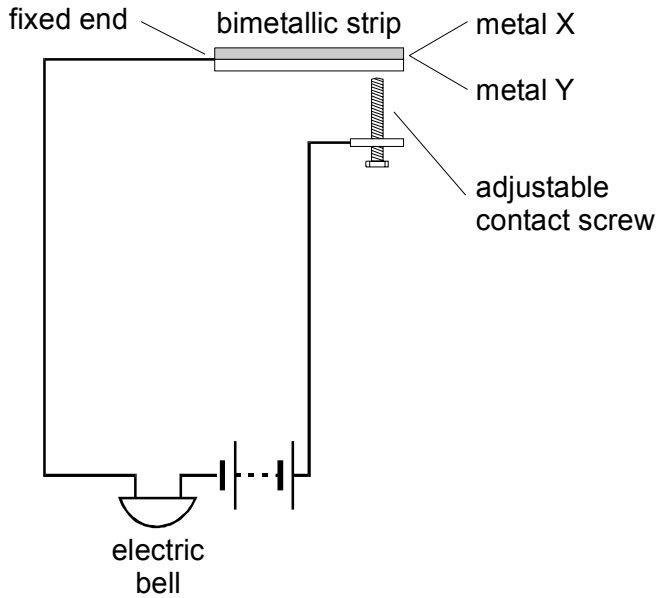
bimetallic strip during heating

Which pair of metals in the table below could be used to make the bimetallic strip? Tick **one** box in the right-hand column below.

metal A	metal B	
brass	aluminium	<input type="checkbox"/>
steel	brass	<input type="checkbox"/>
brass	steel	<input type="checkbox"/>
iron	brass	<input type="checkbox"/>

-

(b) A bimetallic strip is used in a simple fire alarm circuit as shown below.



When the temperature rises, the bimetallic strip bends towards the contact screw. The bimetallic strip should be made from the pair of metals which will make the strip bend the most.

(i) Use the information above to suggest which metal should be metal X and which should be metal Y.

metal X

metal Y

1 mark

(ii) How can the contact screw above be adjusted so that the fire alarm is set off at a lower temperature?

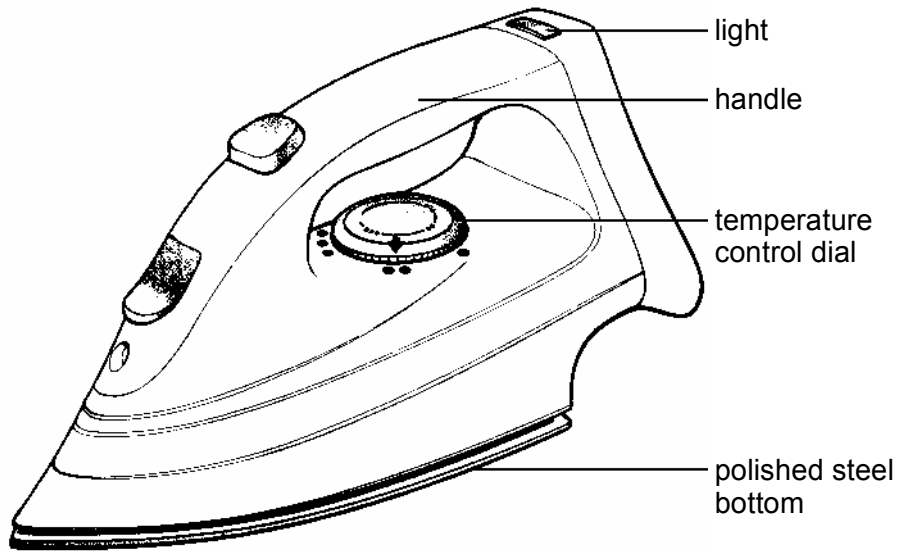
.....
.....

1 mark

Maximum 3 marks

Question 5:

The diagram shows the parts of an iron.



(a) Choose words from the list below to fill the gaps in the sentences.

low high heat poor sound gravity friction electricity

The bottom of the iron is made of steel because steel is a good conductor of, and because steel has a melting point. The steel is polished until it is very smooth to reduce the force of between the iron and the cloth.

3 marks

(b) Suggest what material the handle could be made from.

.....

1 mark




Give a reason for your answer.

.....

.....

1 mark

(c) The iron has three temperature settings.
The settings for different fabrics are shown below.

symbol	 (120°C Max) Cool	 (160°C Max) Warm	 (210°C Max) Hot
control knob settings	●	● ●	● ● ●
fabric	nylon	wool or polyester	cotton or linen

What might happen if nylon clothes are ironed on the ● ● ● setting?

.....

1 mark

(d) After it is switched on, the iron heats up. The time it takes to heat up is shown below.

setting	time to heat up, in seconds
●	38
● ●	
● ● ●	68

Suggest the time to heat up on the ● ● setting.
Write your answer in the table.

1 mark

Maximum 7 marks

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