Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

Figure 1 shows a woman filling her bathroom sink with hot water.

Figure 1

(a) The mirror changes from being dry to being covered with small drops of water.

Name the process causing this change on the mirror.

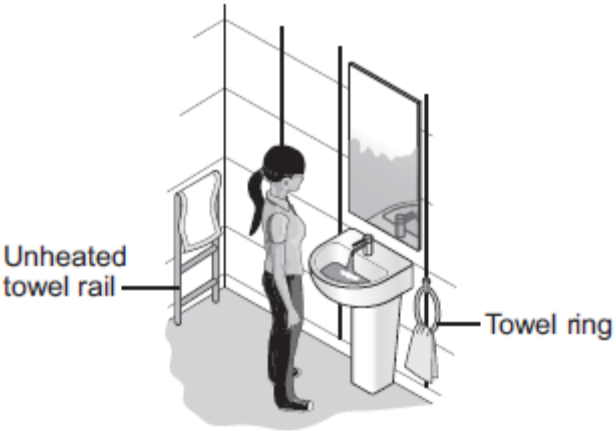
_____

(1)

(b) The woman dries herself with a towel. She hangs the wet towel in the bathroom to dry.

Figure 2 shows two places she could hang the towel.

Figure 2



The towel will dry faster if it is hung from the unheated towel rail instead of the towel ring.

Explain why.

_____

_____

_____

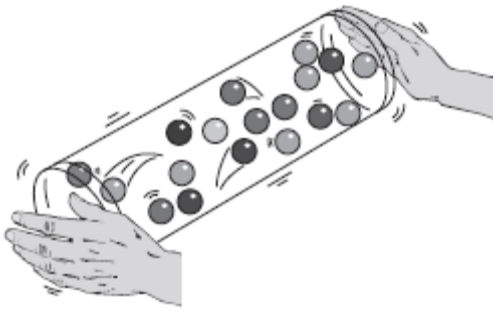
_____

(2)

(Total 3 marks)

Q2.

A student shakes a tube containing small balls to model the movement of particles in a gas.



(a) Why is this a good model for the movement of particles in a gas?

Tick (✓) **two** boxes.

The balls move slowly.	☐
The balls are far apart from each other.	☐
The balls are different colours.	☐
The balls move randomly.	☐

(2)

(b) For a given material, in which state of matter:

are the particles in a regular arrangement?

_____

do the particles have the most kinetic energy?

_____

(2)

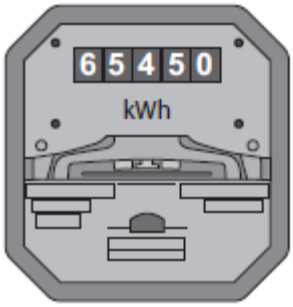
(Total 4 marks)

Q3.

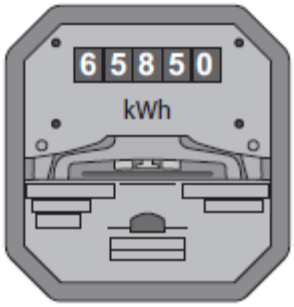
A householder wants to reduce her electricity bills.
The householder takes readings from her electricity meter to see how much electricity she is using.

The pictures show the electricity meter readings at the start and end of April in 2013.

At the start of April



At the end of April



(a) How many kilowatt-hours of electricity did she use in April?

_____

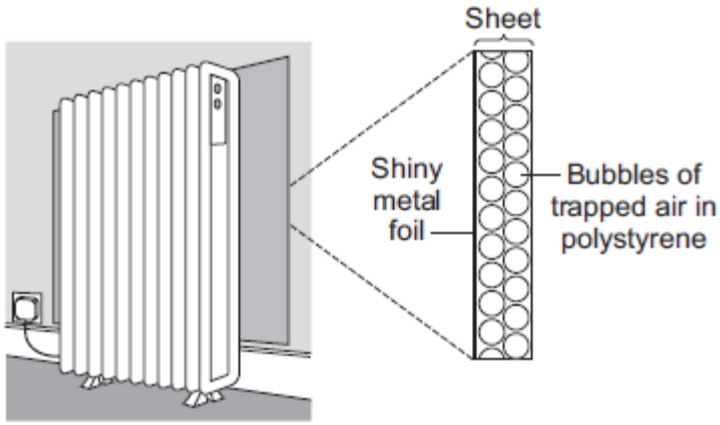
_____

Number of kilowatt-hours = _____

(2)

(b) The householder wants to reduce energy transfer from a room so she puts a special sheet between a heater and the wall.

The side of the sheet facing the heater is shiny metal foil.
The side of the sheet facing the wall is polystyrene.
The polystyrene contains bubbles of trapped air.



What properties of the sheet make it good for reducing energy transfer from the room?

Draw a ring around each correct answer to complete the sentences.

(i) Shiny surfaces are good

absorbers
emitters
reflectors

of infrared radiation.

(1)

(ii) The air in the polystyrene is a good

conductor.
insulator.
emitter.

(1)

(c) The householder turns her heater thermostat down by 2°C so the temperature of the room is lower.

The specific heat capacity of air is 1000 J/kg°C.

The mass of air in the room is 50 kg.

Calculate the energy needed to change the temperature of 50 kg of air by 2°C.

Use the correct equation from the Physics Equations Sheet.

_____

_____

_____

_____

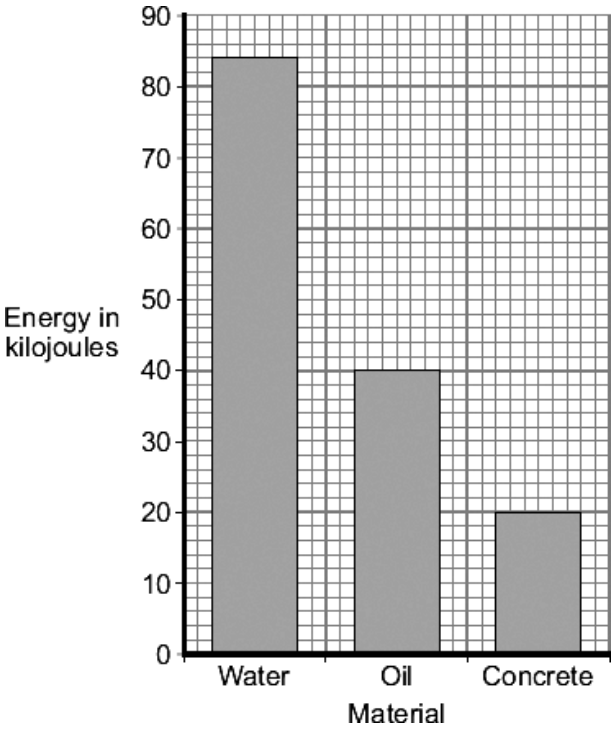
Energy = _____ J

(2)

(Total 6 marks)

Q4.

The bar chart shows the amount of energy needed to raise the temperature of 1 kg of three materials by 20 °C. The materials are used inside heaters.

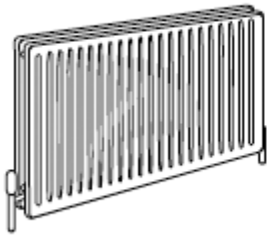
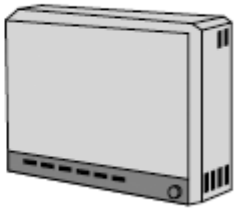


(a) Which material stores most energy?

_____

(1)

(b) The heaters that use the different materials are shown below. The power output when the heaters are being used is shown below each picture.

Water-filled heater	Oil-filled heater	Storage heater (has concrete blocks inside)
		
3 kW	1.5 kW	1.7 kW

Each heater is put in one of three identical rooms. Each room's temperature is 10 °C and the heaters are switched on for 5 hours.

Which heater would cause the biggest temperature rise in the room?

Give a reason for your answer.

Heater _____

Reason _____

(2)

(c) Aluminium has a specific heat capacity of 900 J/kg °C.

Calculate how much energy is needed to raise the temperature of 2 kg of aluminium by 15 °C.

Use the correct equation from the Physics Equations Sheet.

Show clearly how you work out your answer.

_____

_____

_____

_____

Energy = _____ J

(2)

(Total 5 marks)