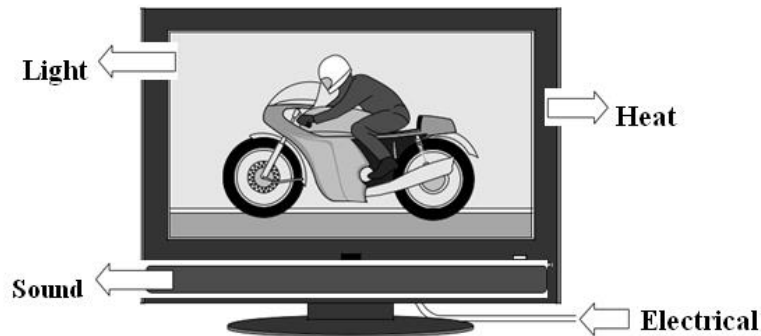# Conservation of Energy and Power And Energy Forms 3

Q:1 The diagram shows the energy transformations produced by a TV.

(a) Use words from the diagram to complete the following sentence.

The TV is designed to transform ——————————————— energy into

light and ————————————— energy.

(2 marks)

(b) Which one of the following statements is false? Put a tick (☑) in the box next to the false statement.

The energy transformed by the TV makes the surroundings warmer. ☐

The energy transformed by the TV becomes spread out. ☐

The energy transformed by the TV will be destroyed. ☐ (1 mark)

(c) Two different makes of television, A and B, transform energy at the same rate. Television A wastes less energy than television B.

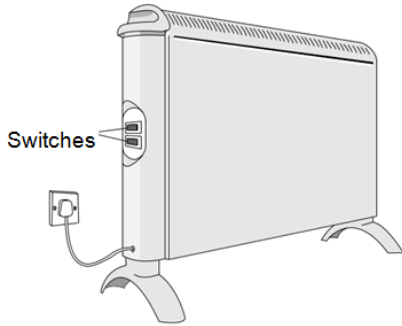Complete the following sentence by drawing a ring around the correct line in the box.

Television A has the | a higher efficiency than |
| same efficiency as | television B.
| Lower efficiency than |

(1 mark)

Q:2(a) The diagram shows two switches on a room heater. The heater has three power settings. The power produced by two of the settings is given in the table.

Setting	Power in kW
Low	0.5
Medium	1.5
High	

Switches

(a) (i) When both switches are on, the heater works at the high power setting.

What is the power of the heater when it is switched to the high power setting?

_____

Power = _____ kW

(1 mark)

(a) (ii) The heater is used on the medium power setting. It is switched on for three hours.

Use the equation in the box to work out the energy transferred from the mains to the heater in three hours.

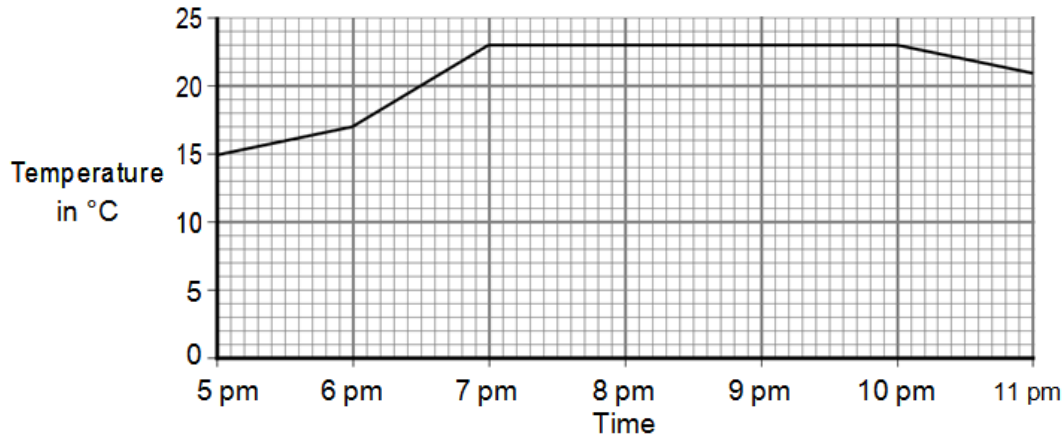| energy transferred	=	power	✕	time
(kilowatt-hour, kWh)		(kilowatt, kW)		(hour, h)

Show clearly how you work out your answer.

_____

_____

Energy transferred = _____ kWh

(2 marks)

(b)   The heater is used to warm a room.

The graph shows how the temperature of the room changes from the moment the heater is switched on.

The heater was first used on the medium setting.

(b) (i)   At what time was the heater setting changed to the high setting?

_____

Give a reason for your answer.

_____

_____

_____

(2 marks)

(b) (ii)   From 7 pm until 10 pm, the temperature of the room is not changing.

Which one of the following statements gives the reason why the temperature of the room is not changing?

Put a tick (☑) in the box next to your answer.

The room is losing energy slower than the heater supplies energy.   ☐

The room is losing energy as fast as the heater supplies energy.   ☐

The room is losing energy faster than the heater supplies energy.   ☐
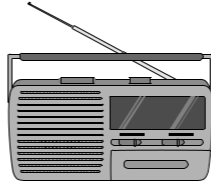
(1 mark)

Q:3 The diagram shows four electrical appliances. Each appliance is designed to transform electrical energy into one form of output energy.

| Kettle | Toaster | Radio | Hair straighteners |

(a) Which one of the appliances is designed to give a different form of output energy from the other three appliances?

_____

Give a reason for your answer.

_____

_____

(2 marks)

(b) The power of each appliance is given in the table.

Appliance	Power
Kettle	2.5 kW
Toaster	920 W
Radio	15 W
Hair straighteners	75 W

Each appliance is switched on for 5 minutes. Which appliance transforms the most energy?

_____

<div align="right">(1 mark)</div>

(c) The graph shows how the time to boil water in an electric kettle depends on the volume of water in the kettle.
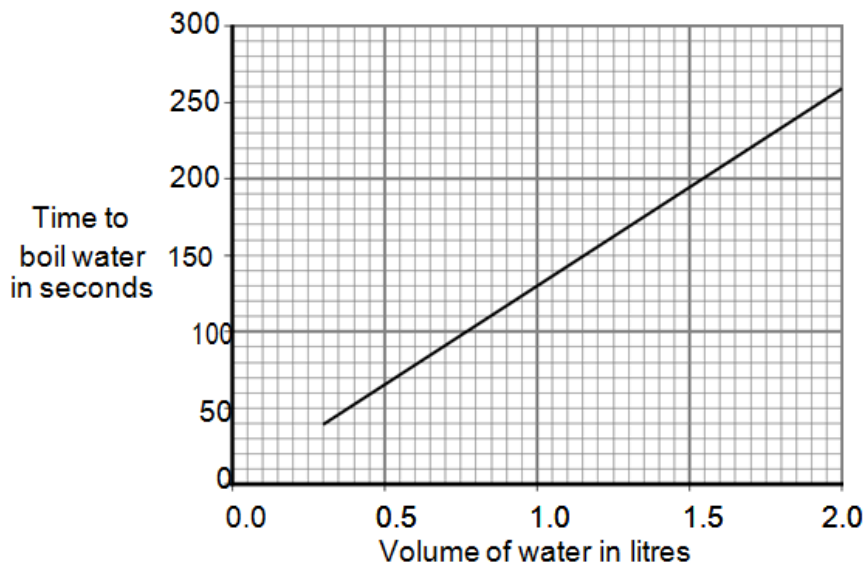
A householder always fills the electric kettle to the top, even when only enough boiling water for one small cup of coffee is required. Explain how the householder is wasting money.

_____

_____

_____

_____

_____

<div align="right">(3 marks)</div>

Q:4   Electricity can be generated using various energy sources.

(a)   Give one advantage and one disadvantage of using nuclear power stations rather than gas-fired power stations to generate electricity.

Advantage _____

_____

Disadvantage _____

_____

[2 marks]

(b) (i)   A single wind turbine has a maximum power output of 2 000 000 W.

The wind turbine operated continuously at maximum power for 6 hours.

Calculate the energy output in kilowatt-hours of the wind turbine.

Use the correct equation from the Physics Equations Sheet.

_____

_____

_____

Energy output = _____ kWh

[2 marks]

(b) (ii)   Why, on average, do wind turbines operate at maximum power output for only 30% of the time?

_____

_____

[2 marks]

Q:5 Figure 1 shows a man using a leaf blower to move leaves.

Figure 1

The leaf blower is powered by an electric motor connected to a battery.

**(a)** Energy transfers take place when the leaf blower is being used.

Complete the following sentences.

The battery stores _____ . energy which is transferred into electrical energy.

The electric motor transfers electrical energy usefully into _____ energy.

The motor wastes energy as _____ and as energy that heats the surroundings.

(b) Figure 2 shows a Sankey diagram for the leaf blower.
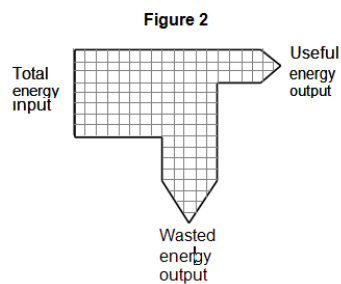
Use Figure 2 to calculate the efficiency of the leaf blower. Use the correct equation from the Physics Equations Sheet.

_____

_____

Efficiency = _____ (2 marks)

TOTAL MARKS=25