1) Fig. 5.1 shows a wave-powered generator. It generates electricity from the movement of sea waves.

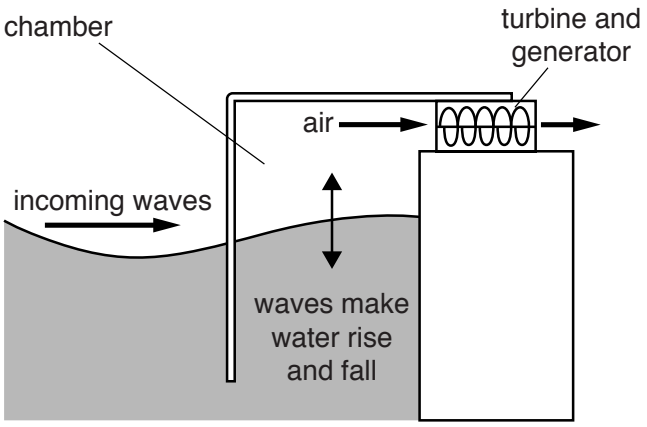
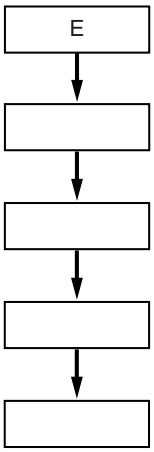


Fig. 5.1

(a) The sentences below describe how the wave-powered generator works.

A Air is pushed through the turbine, making it spin.
B Water rises and falls in the chamber.
C The turbine turns a generator.
D The generator produces electrical energy.
E Waves travel towards the chamber.

Write letters in the boxes below to arrange the sentences in the correct order. The first one is done for you.



[3]

(b) More electricity needs to be generated from renewable sources instead of from burning fossil fuels.

State **three** benefits of generating electricity from renewable sources rather than from fossil fuels.

.....

.....

.....

.....

.....[3]

[Total: 6]

2) Fig. 3.1 shows a metal plate-warmer.

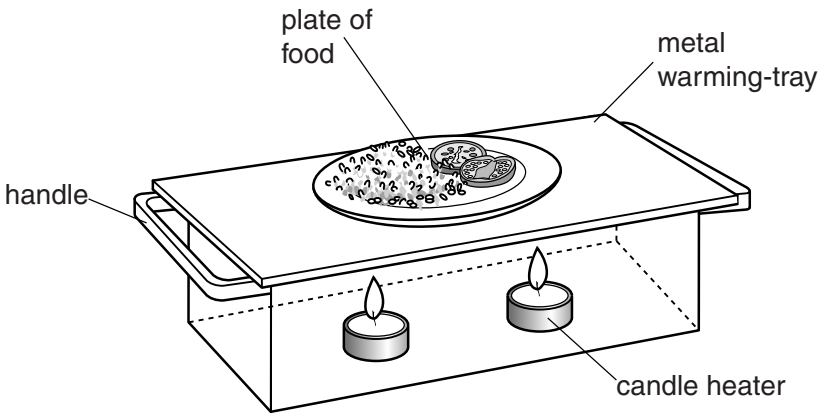


Fig. 3.1

The plate-warmer contains two small candle heaters. Plates of food are placed on top of the warming-tray.

(a) (i) State the name of a process by which the thermal energy from the candles passes to the warming-tray.

.....[1]

(ii) State the name of the process by which thermal energy moves through the warming-tray.

.....[1]

(b) The outside of the plate-warmer is shiny.

Suggest how this helps the plate-warmer to stay hot.

.....[1]

(c) The handles of the plate-warmer are made from metal.

Identify a problem with this, and suggest how the problem could be solved.

problem: .....

action: .....
[2]

[Total: 5]

3) Fig. 4.1 is a simplified diagram of a geothermal power station.

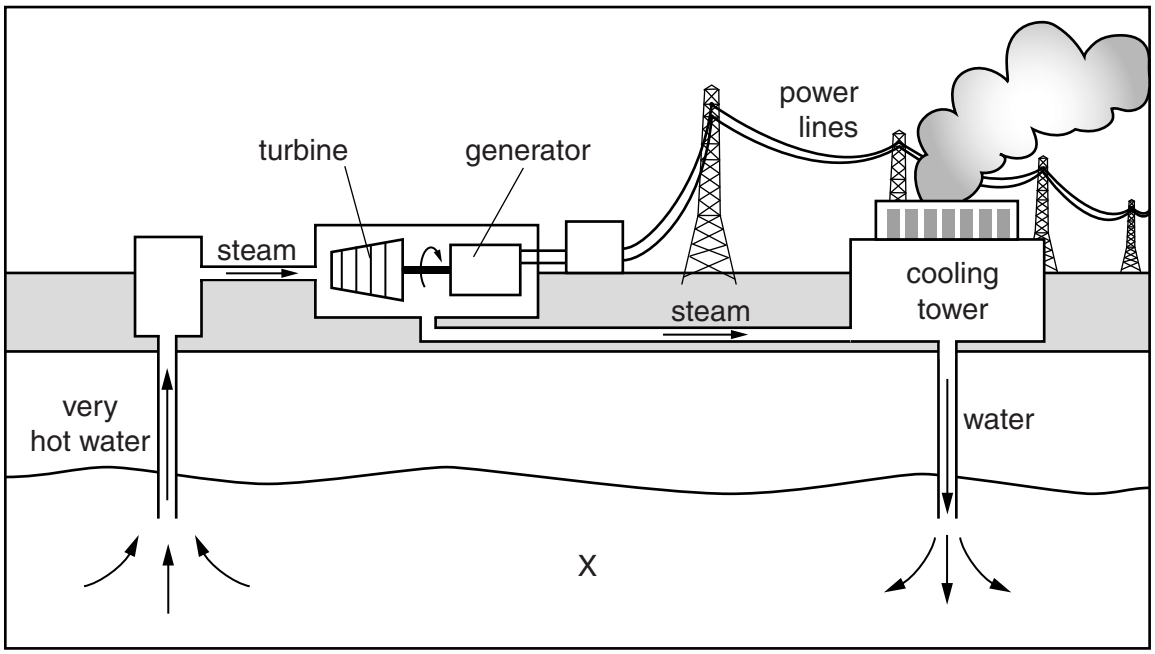


Fig. 4.1

(a) Describe the energy resource labelled X in Fig. 4.1.

.....[1]

(b) Identify the useful energy transformation that takes place in the geothermal power station. Tick **one** box in each column.

input energy		output energy	
chemical	☐	chemical	☐
electrical	☐	electrical	☐
gravitational	☐	gravitational	☐
sound	☐	sound	☐
thermal	☐	thermal	☐

[2]

(c) State **two** disadvantages of obtaining energy from fossil fuels.

1. .....

.....

2. .....

.....

[2]

[Total: 5]

4) Electricity can be generated using wind turbines.

Fig. 5.3 shows two wind turbines.

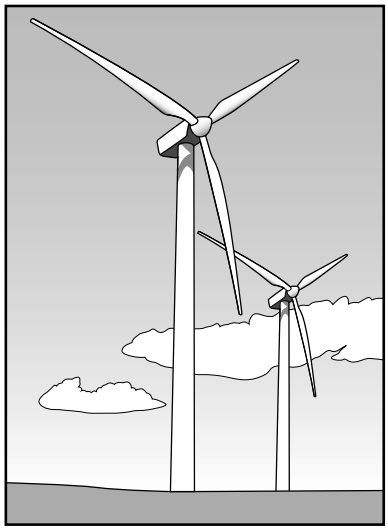


Fig. 5.3

State **two** advantages and **two** disadvantages of using wind turbines, rather than fossil fuels, to generate electricity.

advantages .....

.....

.....

.....

disadvantages .....

.....

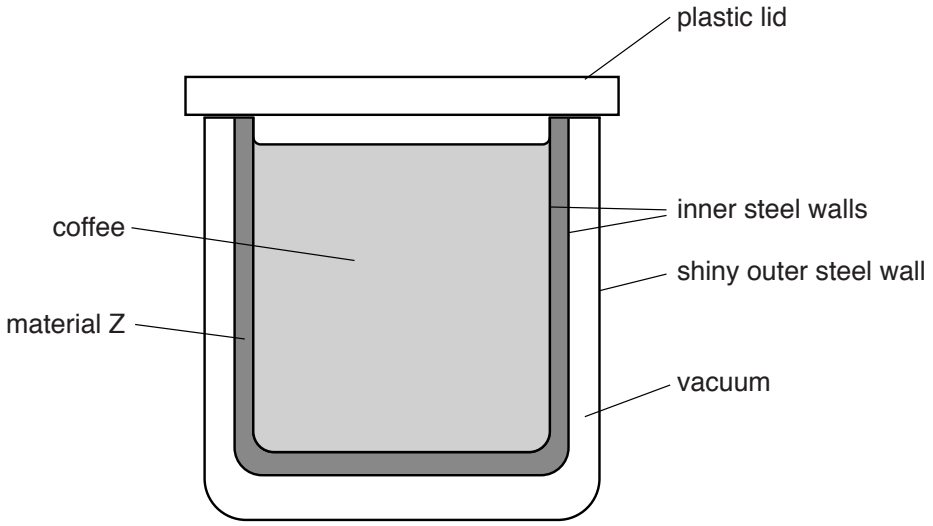
.....

.....

[4]

5) Researchers have found that the best temperature for drinking coffee is 60 °C.

A designer has developed a new type of cup for keeping coffee at 60 °C. The cup is shown in Fig. 8.1.



Material Z has a melting point of 60 °C. At room temperature, material Z is solid.

Coffee, at a temperature of 90 °C, is poured into the cup. The coffee cools rapidly to 60 °C.

(a) State what happens to material Z when the hot coffee is poured into the cup.

..... [1]

(b) Explain how the features of the cup enable the coffee to be kept at 60 °C for a long time.

plastic lid .....

.....

.....

vacuum .....

.....

.....

shiny outer steel wall .....

.....

.....

material Z .....

.....

.....

.....

.....

[5]

[Total: 6]

6) The owner of a small factory suggests installing a wind turbine to generate some of the electricity needed by the factory.

(a) Give one environmental reason for using a wind turbine.

.....

[1]

(b) Discuss **three** of the factors that the owner will need to consider when deciding whether to install a wind turbine.

.....

.....

.....

.....

.....

.....

[4]

[Total: 5]

7) Fig. 7.1 shows a stationary pole vaulter holding a straight pole. Fig. 7.2 shows him during the vault with the pole bent.

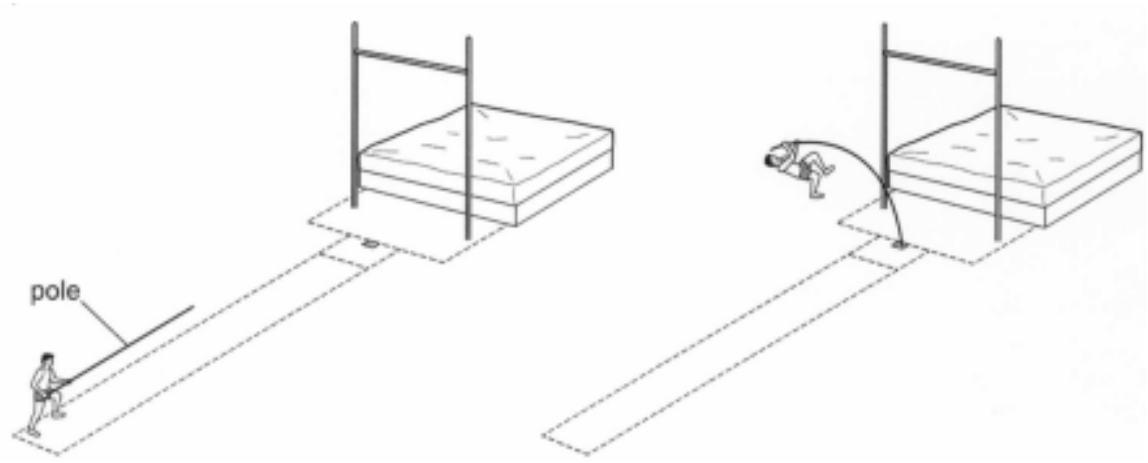


Fig. 7.1 **Fig. 7.2**

(a) Identify the energy changes that have taken place, for the pole vaulter and for the pole, between the situations shown in Figs. 7.1 and 7.2. State the evidence for these changes.

.....

.....

.....

.....

.....

..... [4]

(b) The pole vaulter releases the pole and clears the bar.

Explain how the principle of conservation of energy applies as he falls from his maximum height.

.....

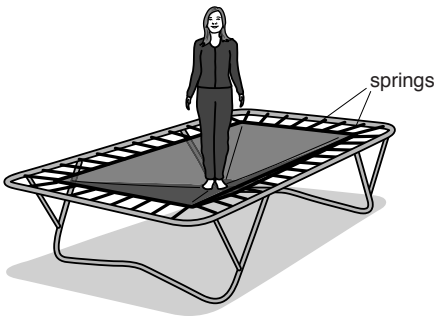
.....

..... [2]

[Total: 6]

8) An athlete of mass 64 kg is bouncing up and down on a trampoline.

At one moment, the athlete is stationary on the stretched surface of the trampoline. Fig. 3.1 shows the athlete at this moment.



(a) State the form of energy stored due to the stretching of the surface of the trampoline.

.....[1]

(b) The stretched surface of the trampoline begins to contract. The athlete is pushed vertically upwards and she accelerates. At time *t*, when her upwards velocity is 6.0 m/s, she loses contact with the surface.

(i) Calculate her kinetic energy at time *t*.

kinetic energy = ...[2]

(ii) Calculate the maximum possible distance she can travel upwards after time *t*.

maximum distance = ...[3]

(iii) In practice, she travels upwards through a slightly smaller distance than the distance calculated in **(ii)**.

Suggest why this is so.

.....

.....[1]