



KS3 Science

Energy Resources

Question Paper

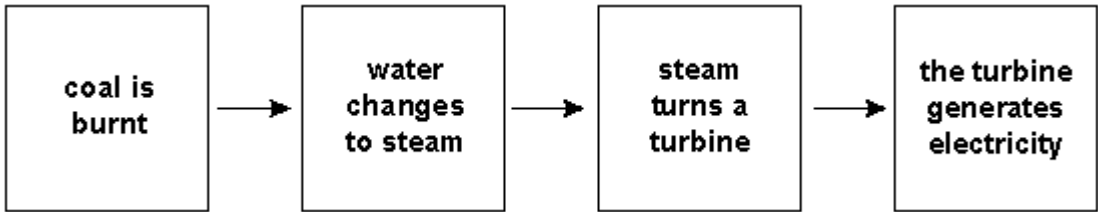
Time available: 37 minutes

Marks available: 57 marks

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1.

In a power station, coal can be used to generate electricity.



(a) Use words from the box to answer the questions below.

chemical	electrical	gravitational potential	
kinetic	light	sound	thermal

1 mark

(i) What is the useful energy transfer when coal is burnt?

..... energy is transferred to energy

1 mark

(ii) Some of the energy stored in coal is wasted when it is burnt.
Give the name of **one** type of energy released that is **not** useful.

.....

1 mark

- (b) Wind turbines are also used to generate electricity. The wind turns the turbine blades and the turbine blades turn a generator.



Use words from the **box opposite**. Complete the sentence to show the useful energy transfer in a wind turbine and generator.

..... energy is transferred to energy

1 mark

- (c) Suggest **one** disadvantage of using wind to generate electricity.

.....

1 mark

- (d) Sugar cane is a plant.

The sugar from the cane is used to make alcohol. Alcohol is a fuel.



- (i) Which energy source do plants use to produce sugar?

.....

1 mark

- (ii) Is sugar cane a renewable **or** non-renewable source of energy?
 Tick one box.

renewable source non-renewable source

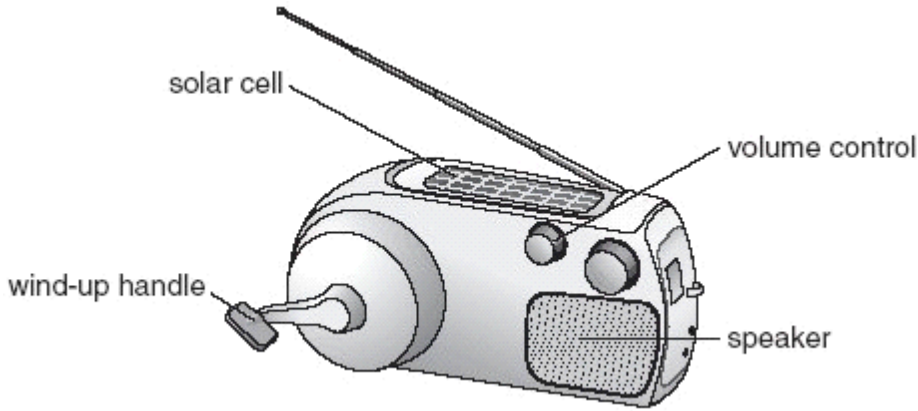
Give a reason for your answer.

.....

1 mark
 maximum 7 marks

2.

Keith has a wind-up radio. It does **not** use batteries. It is powered by a steel spring.



- (a) Keith winds up the spring. As the spring unwinds, potential energy in the spring is transferred to a generator, which then turns.

The generator provides electrical energy for the radio.

Fill the gaps in the sentences below to show the useful energy changes which take place in the generator and the speaker.

- (i) As the generator turns, energy is changed to electrical energy.

1 mark

- (ii) In the speaker, electrical energy is changed to energy.

1 mark

- (b) When Keith turns the volume up so that the radio is louder, the spring unwinds more quickly.

Why does the spring unwind more quickly?

.....

.....

1 mark

- (c) The radio has a solar cell which can also provide electrical energy.

Keith winds up his radio and takes it outside without changing the volume. The steel spring unwinds more slowly when sunlight falls on the solar cell. Explain why.

.....

.....

1 mark

(d) The wind-up radio was designed for use in poorer countries.

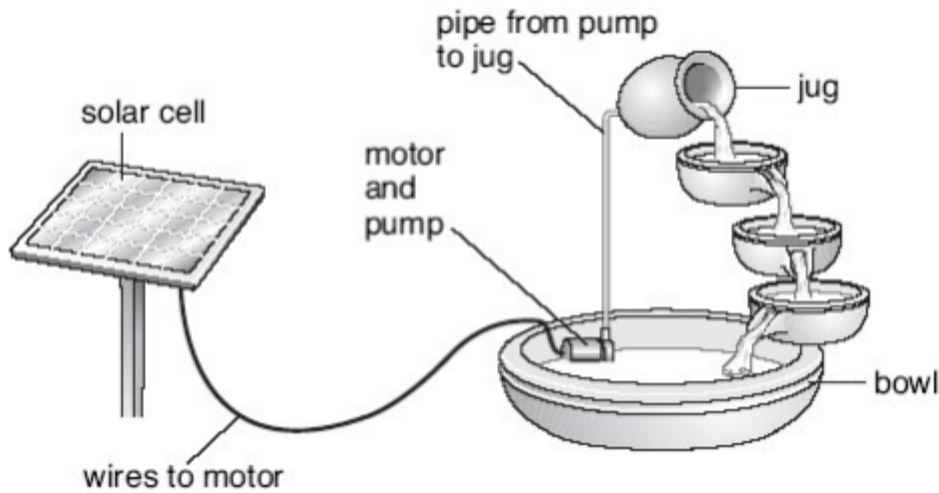
Suggest why wind-up radios are useful in poorer countries.

.....
.....

1 mark
maximum 5 marks

3.

The drawing below shows a garden water feature. It is solar-powered.



The solar cell absorbs energy from the Sun.
The solar cell is connected to a motor in the bowl.
The motor drives a pump.
Water is pumped up to the jug and it flows back down to the bowl.

(a) Use the information above to help you to complete the following sentences.
Choose words from the list.

- chemical
- electrical
- gravitational potential
- kinetic

- light
- sound
- thermal

(i) The useful energy change in the solar cell is from light to energy.

1 mark

(ii) The useful energy change in the motor is from electrical energy to energy.

1 mark

(iii) As the water flows from the jug to the bowl energy is changed into energy.

2 marks

(b) Give **one** advantage and **one** disadvantage of using a solar cell to power the water feature.

advantage

.....

1 mark

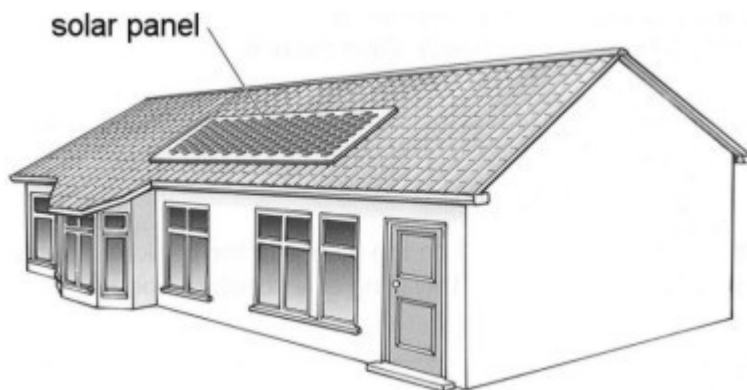
disadvantage

.....

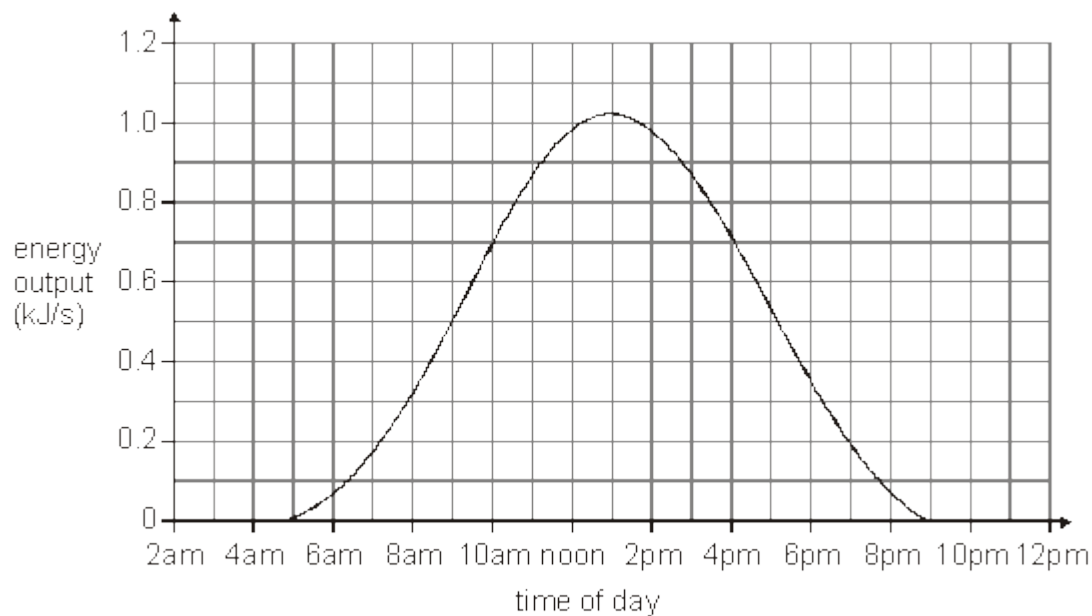
1 mark
maximum 6 marks

4.

The drawing below shows a solar panel fixed to the roof of a house in Britain.



(a) Daniel measured the energy output from this solar panel during one day in June. The graph below shows his results.



(i) Why does the energy output from the solar panel vary during the day?

.....
.....

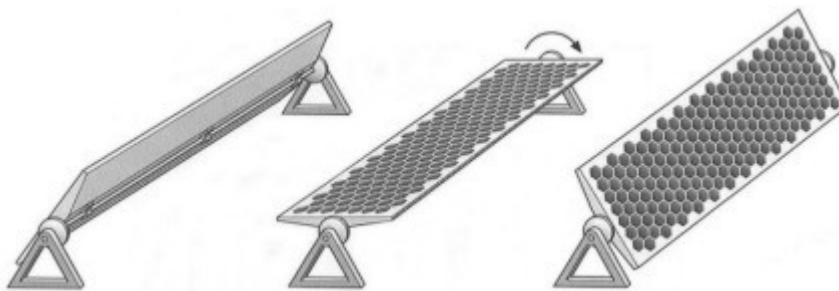
1 mark

(ii) Daniel used the solar panel to run a motor.
The motor needs 0.7 kJ/s to run at full speed.
Use the graph to find out how long Daniel's motor would run at full speed.

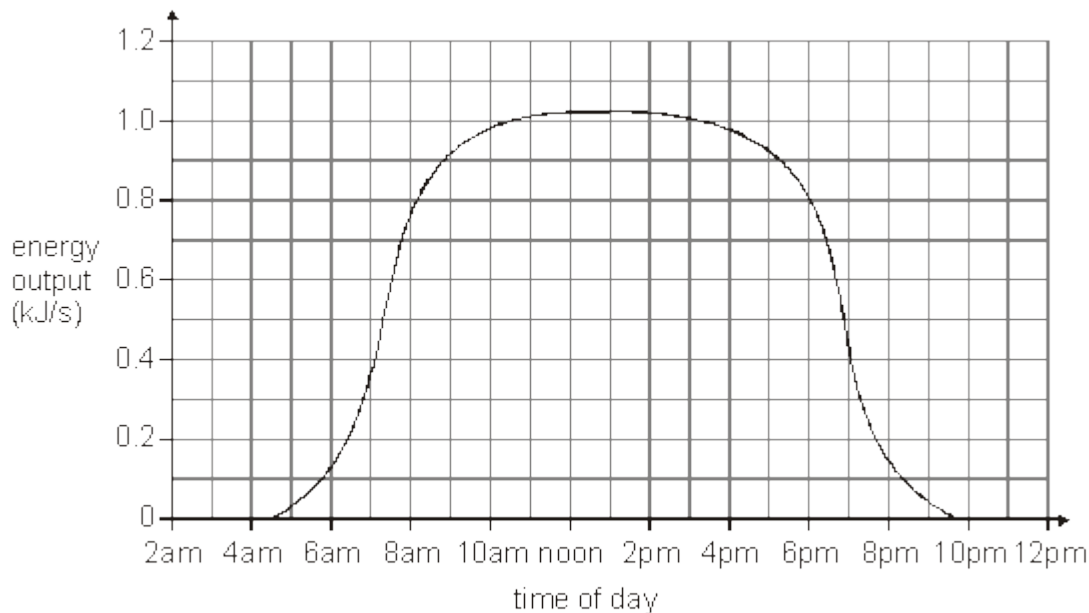
..... hours

1 mark

(b) Daniel measured the energy output from a different solar panel.
This type of solar panel turns so that it always faces the Sun.



The graph below shows the energy output for this panel during one day in **mid-summer**.



(i) On the graph above draw another curve to show how the energy output for this solar panel might vary on a day in **mid-winter**.

2 marks

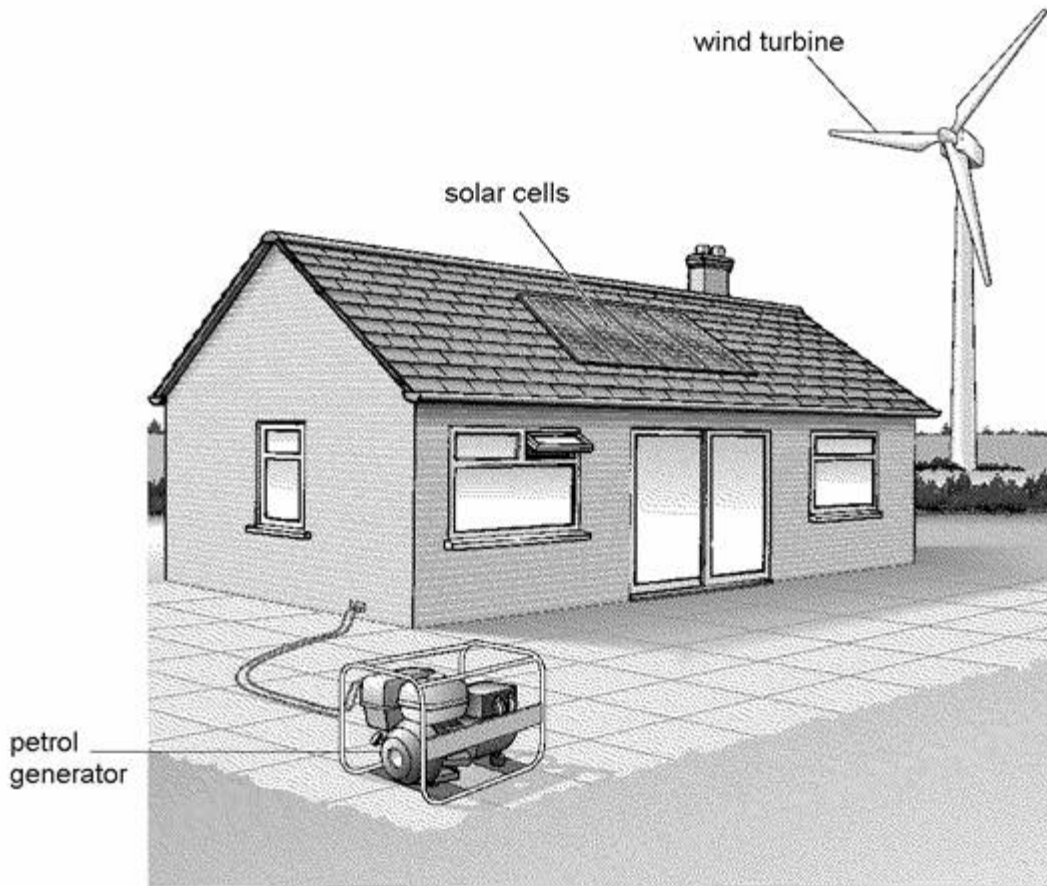
- (ii) Between 7am and 7pm the solar panel turns through an angle of 180° . Calculate the angle the solar panel turns through each hour.

.....
.....degrees

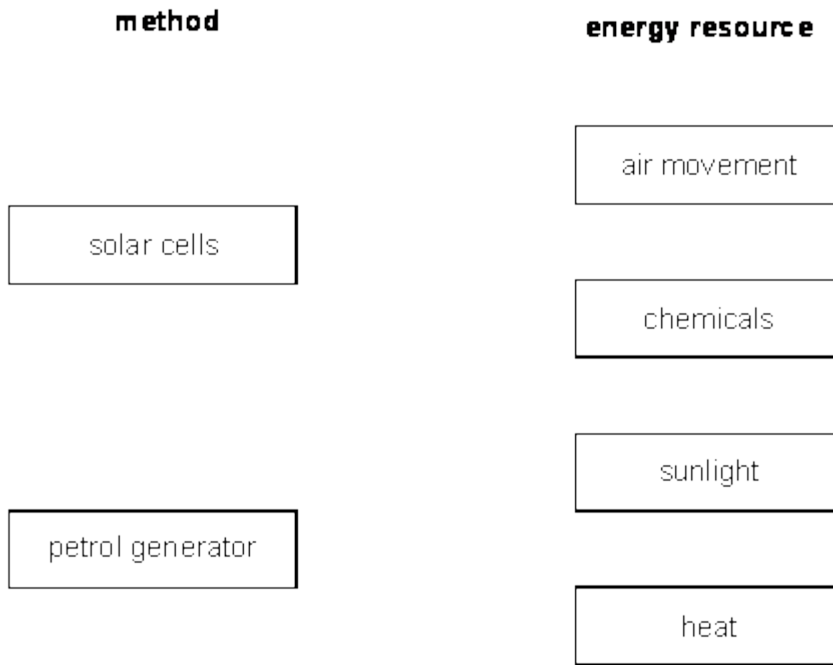
1 mark
maximum 5 marks

5.

The drawing shows Mark's house. He uses three methods to generate electricity.



- (a) Draw a straight line from each of the **two** methods below to the main energy resource used to generate electricity.
Draw only **two** lines.



2 marks

- (b) (i) The solar cells **cannot** work at night.
Give the reason for this.

.....
.....

1 mark

- (ii) The wind turbine **cannot** generate electricity all the time.
Give the reason for this.

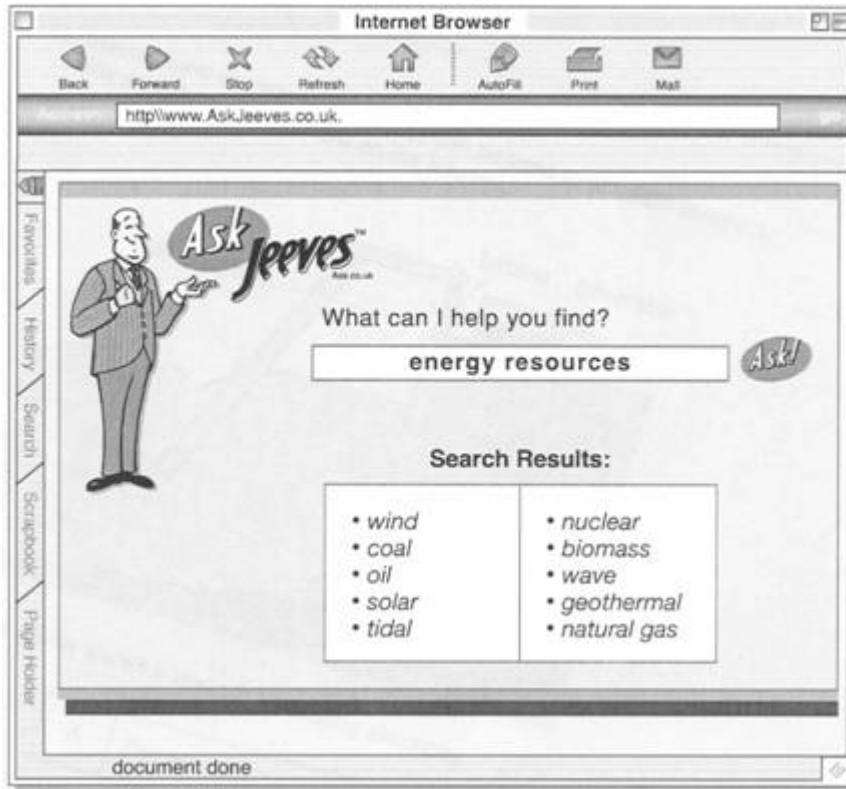
.....
.....

1 mark

Maximum 4 marks

6.

Meera used the Internet to find out about energy resources. The drawing below shows what Meera saw on her computer screen.



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- (a) Coal is a fossil fuel.
Give the names of **two** other fossil fuels in the list on the screen.

.....and.....

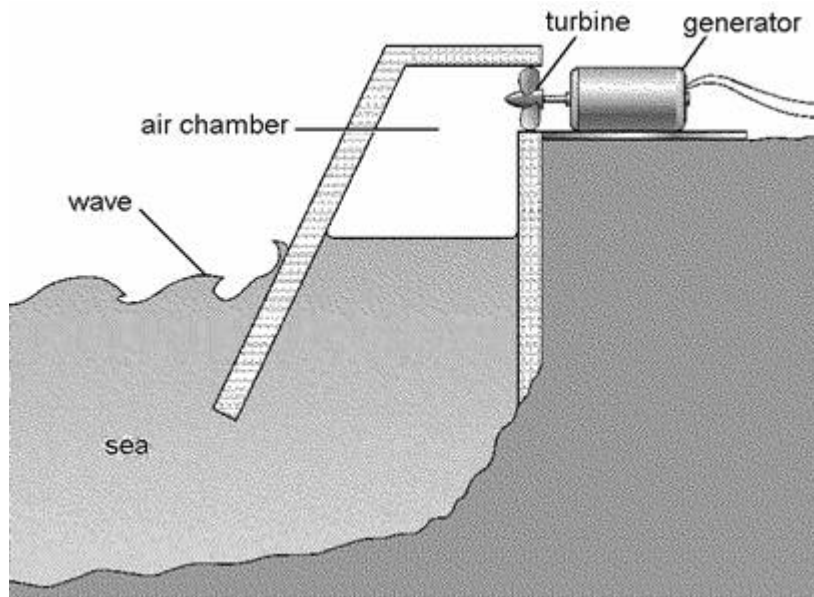
2 marks

- (b) (i) Wave energy is an example of a renewable energy resource.
From the list on the screen above choose **two** other renewable energy resources.

.....and.....

2 marks

- (ii) Meera found out how wave energy can be used to generate electricity. She saw the diagram below on the Internet.



Each box below shows a stage in generating electricity.

A	The air turns the turbine.
---	----------------------------

B	The turbine turns the generator.
---	----------------------------------

C	The waves move up the chamber.
---	--------------------------------

D	The generator produces electricity.
---	-------------------------------------

E	The waves push the air up the chamber.
---	--

On the lines below write the letters of the stages in the correct order. Two have been done for you.

.....C..... A.....

2 marks
Maximum 6 marks

7.

(a) The photographs show ways of getting energy from three different energy resources.

On the line under each photograph write the name of the energy resource.
Choose from the list below.

- batteries biomass wind sunlight tides**

3 marks

(i)



(ii)



Photograph by Solarworks

(iii)



Photograph provided by Robert Harding Picture Library

(b) Name **one** fossil fuel.

.....

1 mark

(c) Complete the sentence below.

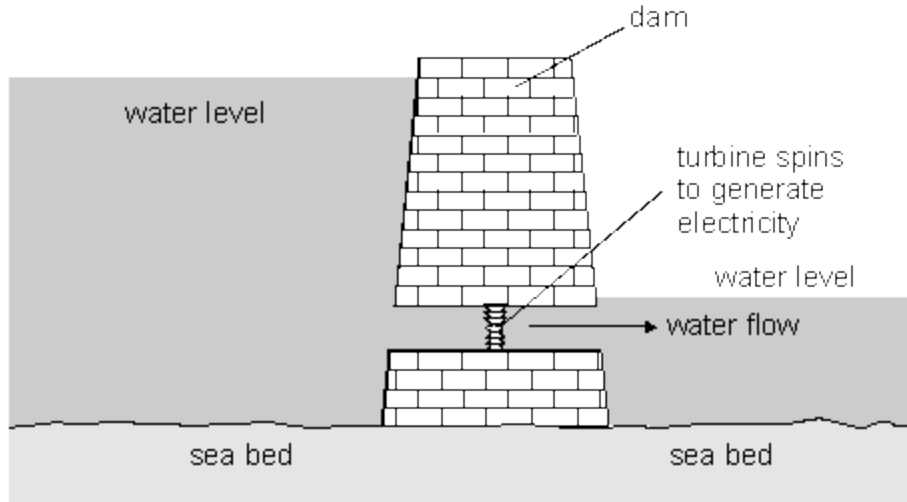
The purpose of the machine in photograph (i) is to generate

1 mark

Maximum 5 marks

8.

The tides can be used to generate electricity. A dam is built across a river estuary, as shown below.



(a) The water is higher on one side of the dam than on the other. As the water begins to flow through the dam it turns a turbine. The turbine generates electricity. Describe the useful energy changes which take place in this process.

.....
.....
.....
.....

2 marks

(b) Explain why tides are classified as a renewable energy source.

.....
.....

1 mark

(c) Give **one** way, **other** than from the tides, of generating electricity by using the sea.

.....

1 mark

- (d) Apart from cost, give **one** advantage and **one** disadvantage of an oil-fired power station compared with a tidal power station.

advantage

.....

disadvantage

.....

2 marks
Maximum 6 marks

9.

Fossil fuels are used to generate electricity, but over half of the world's population uses biomass as a fuel.

- (a) What is 'biomass', which is used as a fuel?

.....

.....

1 mark

- (b) Biomass and fossil fuels are both energy resources. What is the original source of this energy?

.....

.....

1 mark

- (c) Give the names of **three** fossil fuels which are often burned to generate electricity.

1.

2.

3.

1 mark

- (d) Fossil fuels are often described as non-renewable energy resources. Explain why they are called 'non-renewable'.

.....

.....

1 mark

(e) There are advantages and disadvantages of burning different fuels.

(i) Give **one** advantage of using biomass rather than fossil fuel as an energy resource.

.....
.....

1 mark

(ii) Give **one** advantage of using fossil fuel rather than biomass as an energy resource.

.....
.....

1 mark

(iii) Give **one disadvantage** of using both fossil fuel and biomass.

.....
.....

1 mark

Maximum 7 marks

10.

Coal is a non-renewable energy resource.

(a) Give **two other** non-renewable energy resources.

1.
2.

2 marks

Wood is a renewable energy resource.

(b) Why can wood be described as a renewable energy resource?

.....
.....

1 mark

(c) Give **two other** renewable energy resources.

1.
2.

2 marks

(d) Complete the statement below to describe what happens when wood burns.

When wood burns, chemical energy in the wood is transformed
into energy, which is transferred to the surroundings.

1 mark

Maximum 6 marks