

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Q1.

Four students are talking about the different energy sources used to generate electricity in the areas where they live.

- (a) Draw **one** line from where each student lives (**List A**) to the energy source in their area (**List B**).

Draw only **four** lines.

List A
Where each student lives

Where I live is the sunniest part of the country.

Where I live, the land is very flat and it always seems to be windy.

Where I live, it is not safe to swim. The sea is always too rough.

Where I live, you can see steam coming out of the ground.

List B
Energy source

Wind

Waves

Solar

Tides

Geothermal

(4)

- (b) All of the energy sources given in part (a) can be used to generate electricity.

What else do all these energy sources have in common?

(1)

- (c) In a hydroelectric power station, the energy from falling water is used to generate electricity.

Which **one** of the following gives a **disadvantage** of a hydroelectric power station?

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

has a fast start-up time

☐

large areas of land are flooded

☐

polluting gases are produced

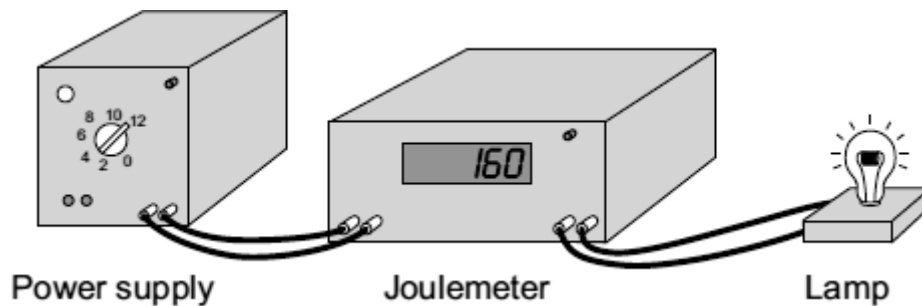
☐

(1)

(Total 6 marks)

Q2.

A student used a joulemeter to measure the energy transformed by a lamp.



The student set the joulemeter to zero, and then switched on the power supply.

After 120 seconds (2 minutes), the reading on the joulemeter had increased to 2880.

(a) In the space below, draw the circuit symbol used to represent a lamp.

(1)

(b) (i) Use the equation in the box to calculate the power of the lamp.

$$\text{power} = \frac{\text{energy transformed}}{\text{time}}$$

Show clearly how you work out your answer.

- (ii) Which **one** of the following is the unit of power?

Draw a ring around your answer.

joule

newton

watt

(1)

- (c) Complete the following sentence using one of the phrases from the box.

larger than

the same as

smaller than

If the lamp was left switched on for 10 minutes, the amount of energy transformed would be _____ the amount of energy transformed in 2 minutes.

(1)

(Total 5 marks)

Q3.

The picture shows a solar-powered aircraft. The aircraft has no pilot.



Photo by NASA.

- (a) On a summer day, 175 000 joules of energy are supplied to the aircraft's solar cells every second. The useful energy transferred by the solar cells is 35 000 joules every second.
- (i) Use the equation in the box to calculate the efficiency of the solar cells.

$$\text{efficiency} = \frac{\text{useful energy transferred by the device}}{\text{total energy supplied to the device}}$$

Show clearly how you work out your answer.

Efficiency = _____ (2)

- (ii) What happens to the energy that is **not** usefully transferred by the solar cells?

(1)

- (b) The aircraft propellers are driven by electric motors. As well as the solar cells, there are fuel cells that provide additional power to the electric motors.

- (i) Suggest **one** advantage of the aircraft having fuel cells as well as the solar cells.

(1)

- (ii) Give **one** environmental advantage of using electric motors to drive the aircraft propellers rather than motors that burn a fuel.

(1)

- (iii) Eventually, the designers want to produce an unmanned aircraft that can fly at twice the height of a passenger jet for up to six months.

Suggest **one** possible use for an aircraft such as this.

(1)
(Total 6 marks)