

Name of the Student: _____

Max. Marks : 21 Marks

Time : 21 Minutes

Q1.

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)

- (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.

Energy output = _____ kWh

(2)

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

(1)

- (c) An on-shore wind farm is made up of many individual wind turbines.

They are connected to the National Grid using underground power cables.

Give **one** advantage of using underground power cables rather than overhead power cables.

Q2.

- (a) Iceland is a country that generates nearly all of its electricity from renewable sources.

In 2013, about 80% of Iceland's electricity was generated using hydroelectric power stations (HEP).

Describe how electricity is generated in a hydroelectric power station. Include the useful energy transfers taking place.

(4)

- (b) The UK produces most of its electricity from fossil fuels.

Many people in the UK leave their televisions in 'stand by' mode when not in use, instead of switching them off.

It is better for the environment if people switch off their televisions, instead of leaving them in 'stand by' mode.

Explain why.

(3)

- (c) A scientist wrote in a newspaper:

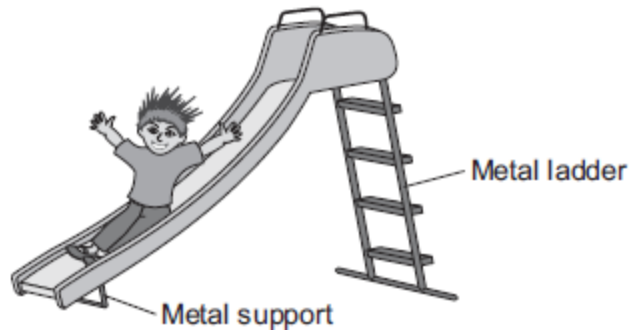
'Appliances that do not automatically switch off when they are not being used should be banned.'

Suggest why scientists alone cannot make the decision to ban these appliances.

(1)
(Total 8 marks)

Q3.

The figure below shows a slide in a children's playground.



- (a) A child of mass 18 kilograms goes down the slide.

The vertical distance from the top to the bottom of the slide is 2.5 metres.

Calculate the decrease in gravitational potential energy of the child sliding from the top to the bottom of the slide.

Gravitational field strength = 10 N / kg

Decrease in gravitational potential energy = _____ J

(2)

- (b) The slide is made of plastic.

- (i) The child becomes electrically charged when he goes down the slide.

Explain why.

(2)

- (ii) Going down the slide causes the child's hair to stand on end.

What conclusion about the electrical charge on the child's hair can be made from this observation?

Give a reason for your answer.

(2)

(iii) Why would the child **not** become electrically charged if the slide was made from metal?

(1)

(Total 7 marks)