

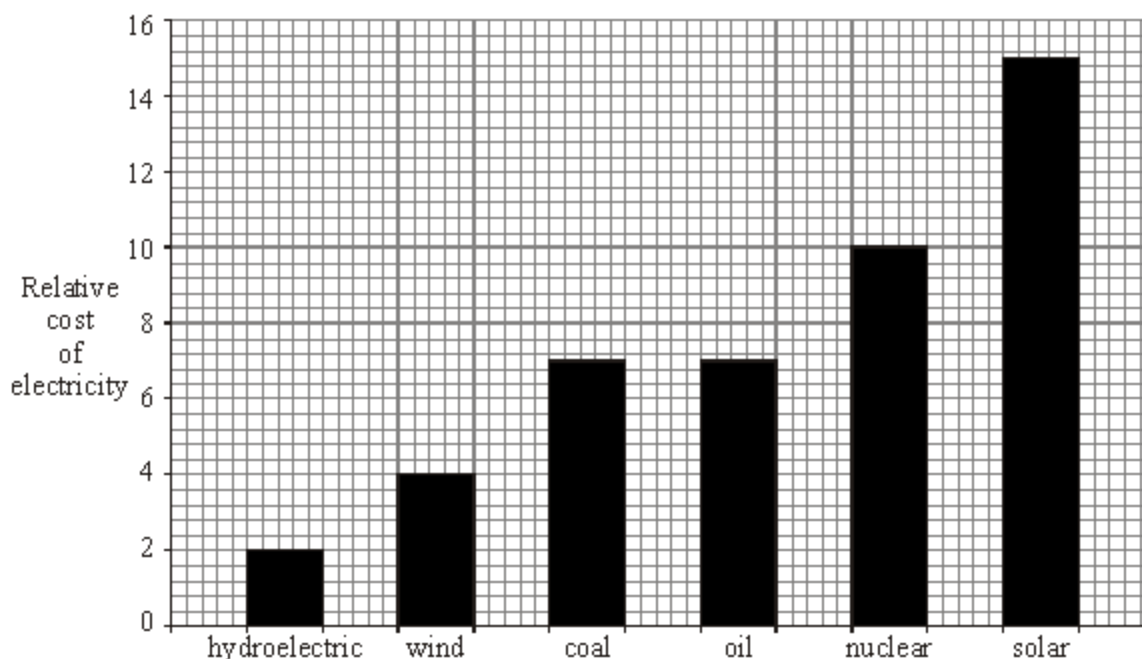
Name of the Student: _____

Max. Marks : 26 Marks

Time : 26 Minutes

Q1.

The bar chart shows the relative costs of some different energy sources that are used to generate electricity.



- (a) Apart from cost, give **two** advantages that a hydroelectric power station has compared with a wind farm.

1. _____

2. _____

(2)

- (b) Apart from cost, give **one** advantage and **one** disadvantage that a nuclear power station has compared with a coal-fired power station.

Advantage _____

Disadvantage _____

(2)

- (c) State and explain **one** situation where it is better to use solar energy, rather than any of the other energy sources, to generate electricity.

(2)

(Total 6 marks)

Q2.

When a gun is fired, a very large force acts on the bullet for a very short time.

The change in momentum of the bullet is given by the following relationship:

$$\text{force (N)} \times \text{time(s)} = \text{change in momentum (kg m/s)}$$

- (a) An average force of 4000 newton acts for 0.01 seconds on a bullet of mass 50g.

Calculate the speed of the bullet. (*Show your working.*)

Answer _____ m/s

(4)

- (b) The bullet is fired horizontally. In the short time it takes for the bullet to reach its target, its horizontal speed has fallen to 80% of its initial speed.

- (i) Explain why the speed of the bullet decreases so quickly.

(2)

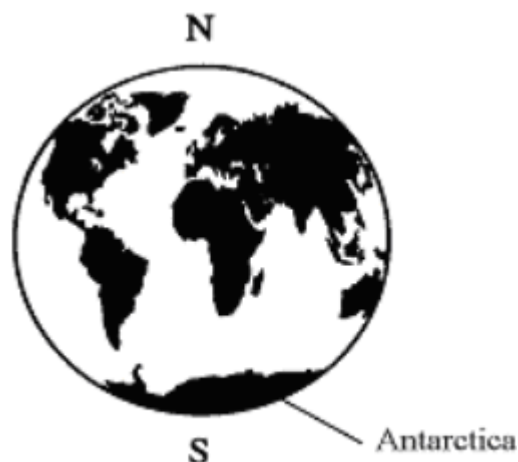
- (ii) Calculate the percentage of its original kinetic energy the bullet still has when it reaches its target.

(*Show your working.*)

(4)

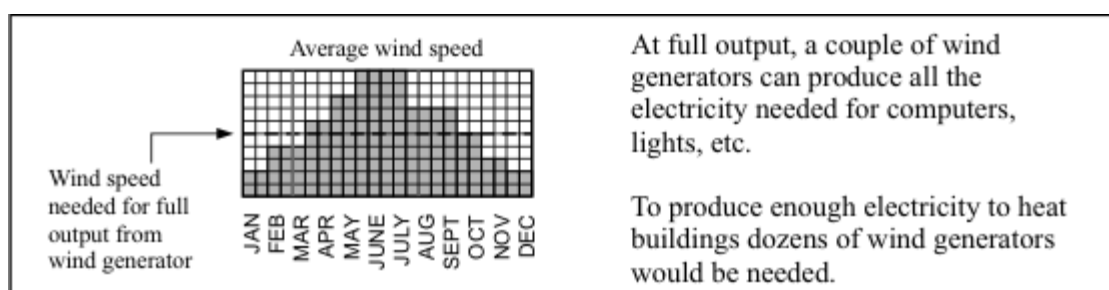
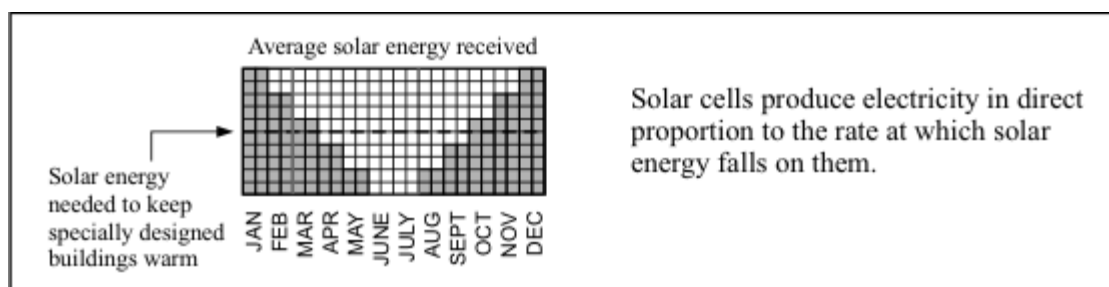
Q3.

Antarctica is a huge land mass surrounding the Earth's south pole. It is covered in a very thick layer of ice and is the only remaining large area of the Earth's surface that has not been affected very much by humans.



There are, however, teams of scientists from various countries studying Antarctica. These scientists need electricity for lighting, for their computers and other scientific instruments and to communicate, via satellite, with the rest of the world. The temperature in Antarctica is always sub-zero, so the scientists need some way of keeping their buildings warm. They also need fuel to be able to get around on their snowmobiles.

Scientists cannot avoid affecting the environment. However, they want to affect it as little as possible.



Atmospheric pollution produced in one country eventually affects the whole of the Earth's atmosphere. The hole that appears each year in the ozone layer above Antarctica, for example, is mainly caused by pollutants such as CFCs from countries in the northern half of the Earth.

Discuss the advantages and disadvantages of using the following energy sources to meet the scientists' needs:

- solar energy
- energy from the wind
- natural gas (present in large quantities deep down in the Antarctic land mass)
- diesel oil (which would have to be imported)

(Total 10 marks)