Energy and electricity

1. Energy is transformed when mechanical toys, candles, turbines and water wheels are used. Complete the energy transformations for each of them.

   a. a wind-up toy:
   
   \[ \text{mechanical energy} \rightarrow \text{electric energy} \]

   b. a candle:
   
   \[ \text{chemical energy} \rightarrow \text{heat energy} \text{ and } \text{light energy} \]

   c. a wind turbine:
   
   \[ \text{wind energy} \rightarrow \text{electric energy} \]

   d. a water wheel:
   
   \[ \text{water energy} \rightarrow \text{electric energy} \]

2. All the bulbs in the circuits are the same.

   a. Write down the reading on each voltmeter.

   \[ P: \quad Q: \quad R: \quad S: \]

   b. Complete this sentence by crossing out the words that are wrong.

   The bulbs in the series circuit will be brighter/less bright than the bulbs in the parallel circuit because they are transforming more/less electrical energy to light energy.
3. Which of the appliances will use the most electricity in an hour? Circle the letter showing the correct answer.
   A. a 3 kW electric fire
   B. a 1 kW kettle
   C. a 60 W lamp
   D. a 500 W hairdryer.

4. Look at the diagram of a model for describing an electric circuit.

In this model, say what represents each of the following components:

   the cell ........................................................................................................
   the current ..................................................................................................
   voltage ........................................................................................................
   energy ........................................................................................................
   a component ............................................................................................
   a switch ....................................................................................................
   wires .........................................................................................................
5 The diagram shows a gas-fired power station.

Complete the sentences below to explain how it works.

In a gas-fired power station, .................................................. is burned to heat water in the boilers and turn it into .................................................. . This turns the turbines.

The .................................................. turn the generators. The .................................................. is condensed in the .................................................. .................................................. . The waste gases leave through the .................................................. .

6 The two light bulbs both give out the same amount of light.

a Which bulb uses more electrical energy in one minute? ...........

b What happens to the electrical energy that is not transformed into light?

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c Which bulb will get hotter while it is being used? ........

d Explain your answer to c.

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7 Anna says: ‘In all the transformations we have seen, energy is conserved – it is neither created nor destroyed.’

Explain how this can be true if two light bulbs give out the same amount of light while one uses more electrical energy than the other.

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