KS3 SCIENCE · PHYSICS

Energy: exam questions

Name _____
Total: 21 marks

1 Name the energy store that fills when: (a) an object speeds up, (b) an object is lifted higher, (c) a spring is stretched. **[3 marks]**

2 A ball is dropped from a window. Describe the energy transfer as it falls. **[2 marks]**

3 State the law of conservation of energy. **[1 mark]**

4 A motor is supplied with 500 J of energy. It transfers 350 J usefully. Calculate the energy that is wasted, and state what happens to this energy. **[2 marks]**

5 A label shows that 100 g of a breakfast cereal provides 1600 kJ. Calculate the energy in a 50 g bowl of the cereal. Give your answer in kJ and in J. **[2 marks]**

6 A 2 kW heater is used for 3 hours. Electricity costs 30p per kWh. Calculate the cost. **[2 marks]**

7 Give one advantage and one disadvantage of using wind turbines to generate electricity. **[2 marks]**

8 A can of drink at 5 °C is left in a room at 20 °C. Describe and explain what happens to the temperature of the can. **[3 marks]**

9 Explain, using ideas about particles, how energy is conducted along a metal spoon. **[2 marks]**

10 Explain why a woolly hat keeps your head warm. **[2 marks]**

Energy: mark scheme

Total: 21 marks

1 [3 marks]

- (a) Kinetic store **(1)**
- (b) Gravitational potential store **(1)**
- (c) Elastic store (accept: elastic potential, strain) **(1)**

2 [2 marks]

- Its gravitational potential store empties (accept: decreases) **(1)**
- Its kinetic store fills (accept: increases) **(1)**

3 [1 mark]

- Energy cannot be created or destroyed (accept: the total energy stays the same; energy is only transferred between stores) **(1)**

4 [2 marks]

- 500 − 350 = 150 J **(1)**
- It is dissipated (accept: it heats the motor and the surroundings; it goes to the thermal store of the surroundings) **(1)**

5 [2 marks]

- 800 kJ **(1)**
- 800 000 J **(1)**

6 [2 marks]

- Energy = 2 × 3 = 6 kWh **(1)**
- Cost = 6 × 30 = 180p (accept: £1.80) **(1)**

7 [2 marks]

- Advantage: wind is renewable (accept: it will not run out; no carbon dioxide is released as the turbines run; there is no fuel to pay for) **(1)**
- Disadvantage: no electricity is generated when there is no wind (accept: the output depends on the weather; some people think turbines spoil the view) **(1)**

8 [3 marks]

- The temperature of the can rises **(1)**
- Energy is transferred from the warmer room to the colder can **(1)**
- It stops rising at 20 °C, when the can and the room are at the same temperature (accept: thermal equilibrium) **(1)**

9 [2 marks]

- The particles at the hot end vibrate more **(1)**
- They pass energy on to the particles next to them (accept: they knock into their neighbours) **(1)**

10 [2 marks]

- Wool traps air **(1)**
- Air is a poor conductor (accept: air is an insulator), so energy is transferred from your head more slowly **(1)**