**1** An energy resource is used to generate electrical energy.

Which energy resource uses a transfer of gravitational potential energy to generate this electrical energy?

**A** geothermal

**B** hydroelectric

**C** solar

**D** wind

[1]

[Total: 1]

**2** An electric generator produces an electromotive force (e.m.f.) of 200 V and produces a current of 3.0 A in a circuit. The generator is driven by an engine with a power of 2.4 kW.

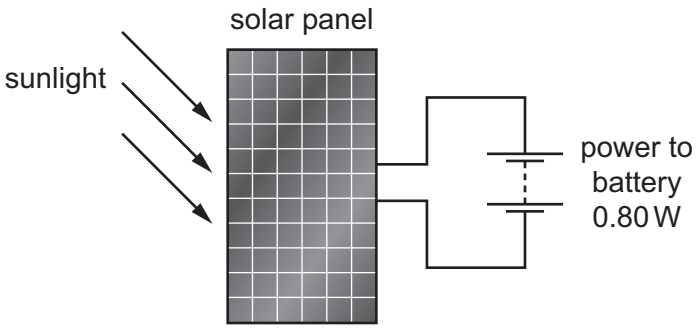
What is the efficiency of the generator?

**A** 2.8% **B** 25% **C** 28% **D** 36%

[1]

[Total: 1]

**3** A solar panel is used to recharge a battery. The solar panel produces 0.80 W of electrical power. The panel is 20% efficient.



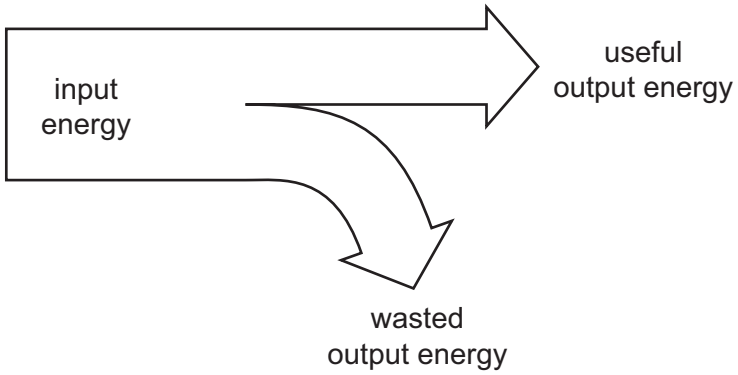

What is the power input of the sunlight onto the solar panel?

**A** 0.16 W **B** 4.0 W **C** 8.0 W **D** 16 W

[1]

[Total: 1]

**4** The diagram represents the energy transfers for a device.




The device is 50% efficient.

Which equation is correct?

**A** input energy = useful output energy ÷ 2

**B** useful output energy = wasted output energy ÷ 2

**C** wasted output energy = useful output energy

**D** wasted output energy = useful output energy ÷ 2

[1]

[Total: 1]

**5** The student is in a country with many hours of sunshine each day. He charges his laptop using a solar panel.

**(a)** Give **two** advantages of using a solar panel, compared with using a mains electrical supply.

1. .....

2. ..... [2]

**(b)** A mains battery charger has a power output of 80 W.
The solar panel has a power output of 16 W.

Describe **one** disadvantage of using the solar panel, compared with using the mains battery charger.

..... [1]

[Total: 3]

**6** Some people are opposed to the use of nuclear power stations.

Give **two** disadvantages of using nuclear power stations.

1. .....

.....

2. .....

..... [2]

[Total: 2]

**7** One use of electricity is to turn an electric motor.
The efficiency of an electric motor is always less than 100%.

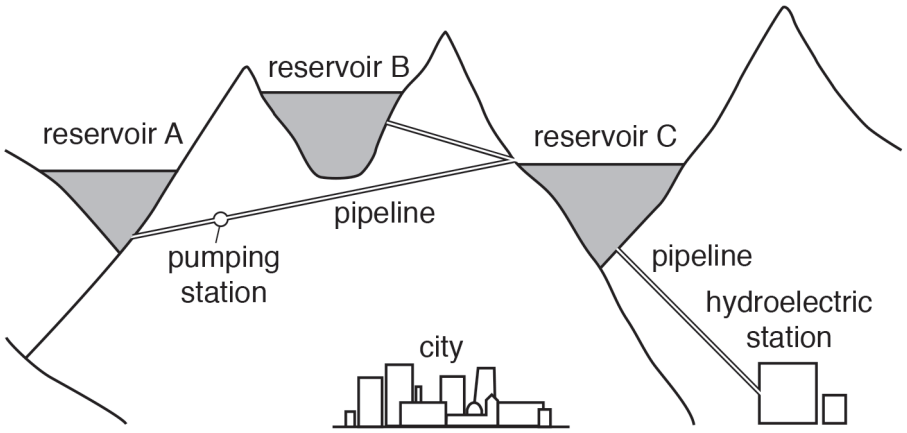
State the meaning of the term *efficiency*.

.....

..... [2]

[Total: 2]

**8** The diagram shows a hydroelectric power system located in the mountains.




**(a)** The reservoirs store energy.

State the terms used to describe the energy stored in the reservoirs.

..... [1]

**(b)** Describe how the energy stored in reservoir C becomes useful energy for the city at the hydroelectric station.

.....

.....

.....

.....

.....

.....

..... [3]

**(c)** Some of the stored energy is wasted. Explain what happens to this energy.

.....

..... [2]

**(d)** Water from reservoirs A and B may flow into reservoir C. It is more efficient to fill reservoir C using water from reservoir B only.

Suggest a reason for this.

.....

..... [1]

[Total: 7]

**9** A nuclear power station generates electricity.

The main stages in the operation of a nuclear power station are listed below. They are **not** in the correct order.

**A** the turbine turns a generator

**B** fission produces thermal energy

**C** water in the boiler becomes hot

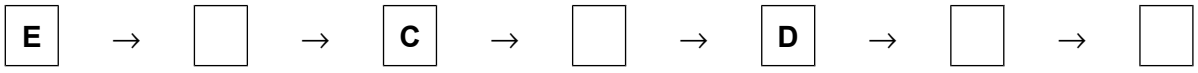
**D** steam turns a turbine

**E** nuclei split apart in the reactor

**F** electromagnetic induction produces the output energy

**G** steam is produced

Complete the flow chart to describe how a nuclear power station works. Insert the missing letters in the empty boxes.




[3]

[Total: 3]

**10** A 40 W lamp wastes 34 J of energy every second by heating its surroundings.

What is the efficiency of the lamp?

**A** 0.15% **B** 15% **C** 18% **D** 85%

[1]

[Total: 1]

**11** Some processes are more efficient than others.

Which expression gives the efficiency of a process?

**A** $\frac{\text{total energy output}}{\text{total energy input}} \times 100\%$

**B** $\frac{\text{useful energy output}}{\text{total energy output}} \times 100\%$

**C** $\frac{\text{wasted energy output}}{\text{total energy input}} \times 100\%$

**D** $\frac{\text{wasted energy output}}{\text{useful energy output}} \times 100\%$

[1]

[Total: 1]