Q1.

A resistor is connected to a power supply.

The potential difference across the resistor is 6.0 V.

(i) Which of these corresponds to a potential difference of 6.0 V?

(1)

- ☒ **A** 6.0 joules per ohm
- ☒ **B** 6.0 amps per coulomb
- ☒ **C** 6.0 joules per coulomb
- ☒ **D** 6.0 amps per ohm

(ii) Calculate the total energy transferred by the 6.0 V power supply when a charge of 42 C flows through the resistor.

(2)

energy = ... J

(Total for question = 3 marks)

Q2.

Figure 20 shows an electrical device connected to the wheels of an electric car.

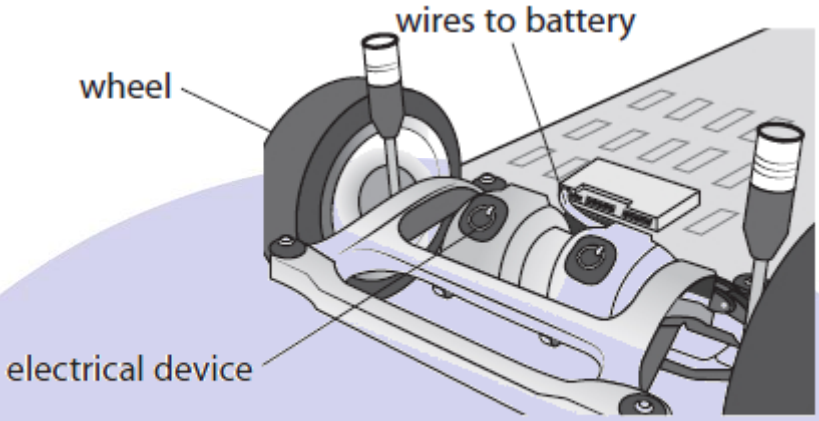

Figure 20

The battery can be recharged at a charging point.

The charging point provides an average current of 15.0 A to the battery, at a potential difference (voltage) of 400 V.

It is claimed that 126 MJ of energy can be transferred to the battery in less than 6 hours.

Calculate the total charge that moves into the battery while it is being recharged.

Use the equation

$$E = Q \times V$$

(2)

charge = ... C

(Total for question = 2 marks)

Q3.

The voltage (potential difference) across a length of wire is 1.5 V.

A charge of 0.042 C flows through the wire.

Calculate the energy transferred.

Use the equation

$$E = Q \times V$$

(2)

E = ... J

(Total for question = 2 marks)

Q4.

Figure 23 shows an electric car connected to a battery charger.

(Source: © Danil Roudenko/123RF)

Figure 23

The car has a rechargeable battery to drive its motor.

The rechargeable battery provides a potential difference of 330 V and can store up to 64 MJ.

It takes 8 hours for the battery to receive a full charge.

Assume that the charging process is 100% efficient.

(a) Calculate the total charge that flows while the battery is being charged.

(3)

total charge = ... C

(Total for question = 3 marks)