8 An electric vehicle has a rechargeable battery.

The battery is recharged by connecting it to a charging station.

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(a) The battery voltage is 385 V.

(i) State the amount of energy transferred when one coulomb of charge passes through a potential difference of 385 V.

(1)

energy transferred = ... J

(ii) Show that, when a charge of 180 000 C passes through the battery, the total amount of energy transferred to the battery is about 70 MJ.

(2)

(iii) During the charging process, energy is also transferred to the charging station from the mains supply.

Explain why the amount of energy transferred from the mains supply is more than 70 MJ.

(2)

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(b) Charging takes 110 minutes and causes a total charge of 180 000 C to pass through the battery.

(i) State the equation linking charge, current and time.

(1)

(ii) Calculate the average charging current in the battery.

(3)

current = ... A

(Total for Question 8 = 9 marks)