7 A man pushes a metal trolley along a corridor towards a lift.

The trolley has nylon wheels and the floor of the corridor is covered with plastic.

The man wears shoes with rubber soles.

As he moves the trolley, the man gains an electric charge.

(a) Explain how the man gains an electric charge.

(2)

(b) The man presses a metal button to operate the lift.

There is a spark and the man receives an electric shock.

The spark lasts for 75 ms and 0.0017 C of charge passes.

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

(1)

(ii) Calculate the average current in the spark.

Give the unit.

(3)

current = ... unit .....

(c) Metal appliances, such as the lift button, are earthed for safety.

Explain why the man receives a shock even though the button is properly earthed.

(3)

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(Total for Question 7 = 9 marks)