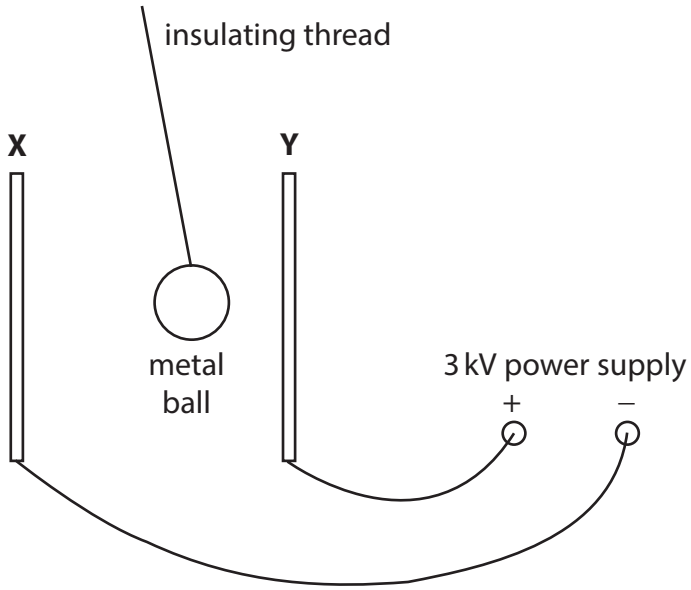
2 This question is about a demonstration to show the link between current and charge.

The diagram shows two metal plates, X and Y, with a metal ball moving between them.



(a) The two metal plates have no charge before the power supply is connected.

When plate Y is connected to the positive terminal of the power supply, the plate becomes positively charged.

Explain how plate Y gains a positive charge.

(2)

(b) (i) The metal ball becomes positively charged when it touches plate Y.

The metal ball then moves away from plate Y towards plate X.

Explain why the metal ball moves away from plate Y.

(2)

(ii) Give a reason why the ball is made of metal.

(1)

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(c) When the metal ball moves away from plate Y to plate X, a charge of 5.1×10^{-6} C is transferred.

(i) State the formula linking charge transferred, current and time taken.

(1)

(ii) Calculate the current if the metal ball takes 0.45 seconds to travel from plate Y to plate X.

(2)

current = ... A

(iii) Suggest why the current increases if the voltage of the power supply is increased.

(1)

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(iv) Give the name of the apparatus that can be used to measure current.

(1)

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(Total for Question 2 = 10 marks)