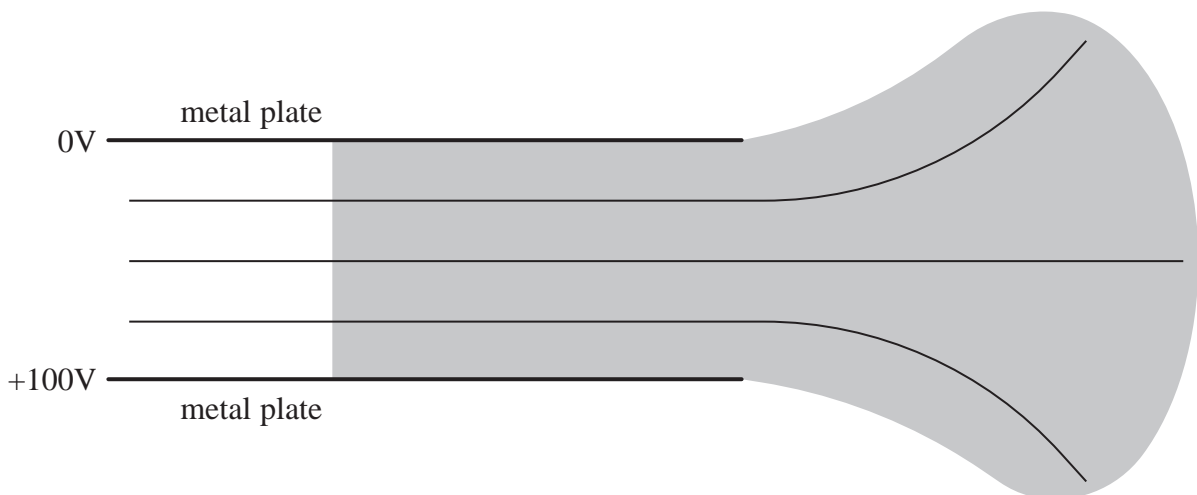
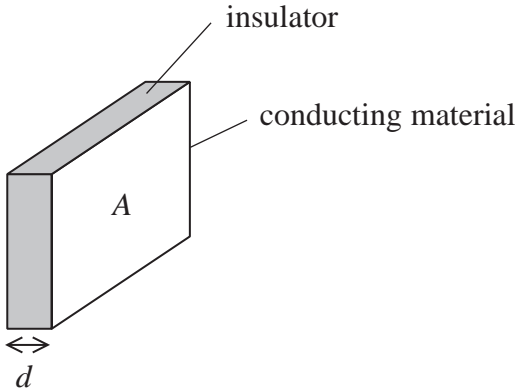


13 The diagram shows two parallel metal plates with a potential difference (p.d.) of 100 V across them. Three equipotential lines are shown.



(a) Draw lines to represent the electric field in the shaded area. (4)

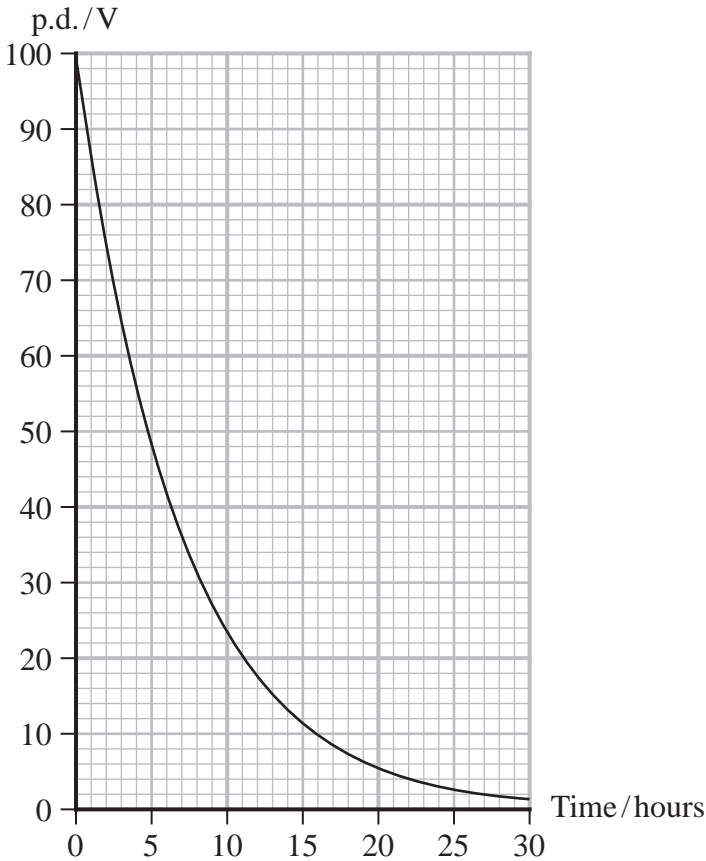
(b) A parallel plate capacitor consists of a thin layer of insulator of thickness d between two plates of conducting material of area A .



The capacitor has a capacitance $0.1\text{ }\mu\text{F}$ and is charged to a p.d. of 100 V by connecting it to an electrical supply.

The capacitor is then disconnected from the supply and the p.d. between the two plates slowly decreases. This is because the insulator is not perfect and a small charge can flow through it.

The graph shows how the p.d. varies with time.



The insulator is a type of plastic and should have a resistivity greater than $10^{14}\text{ }\Omega\text{m}$.

Deduce whether the plastic used in this capacitor has a resistivity greater than this value.

$$A = 5.6 \times 10^{-3}\text{ m}^2$$

$$d = 0.6 \times 10^{-6}\text{ m}$$

(5)