5 **(a)** State what is meant by an *electric field*.

....

.... [1]

(b) An isolated solid metal sphere has radius R. The charge on the sphere is $+Q$ and the electric field strength at its surface is E.

On Fig. 5.1, draw a line to show the variation of the electric field strength with distance x from the centre of the solid sphere for values of x from $x = 0$ to $x = 3R$.
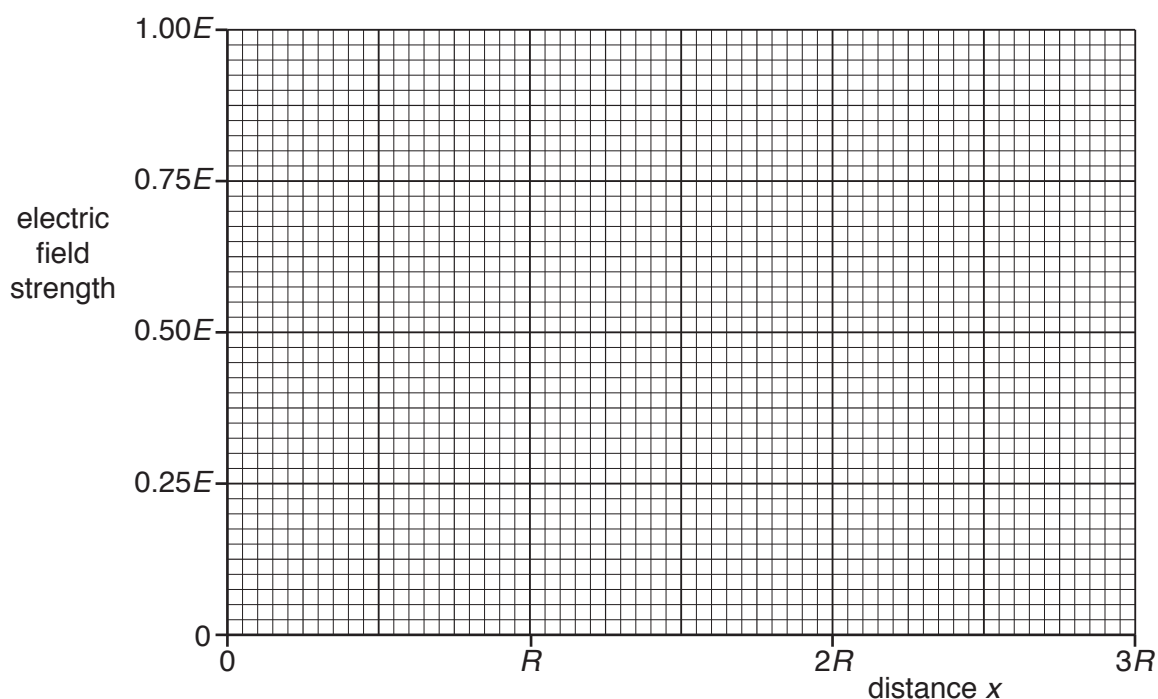

Fig. 5.1

[4]

(c) The sphere in **(b)** has radius $R = 0.26\,\text{m}$.

Electrical breakdown (a spark) occurs when the electric field strength at the surface of the sphere exceeds $2.0 \times 10^6\,\text{V m}^{-1}$.

Determine the maximum charge that can be stored on the sphere before electrical breakdown occurs.

charge = ... C [3]

[Total: 8]