6 Fig. 6.1 shows an isolated metal sphere suspended by an insulating thread from the ceiling.

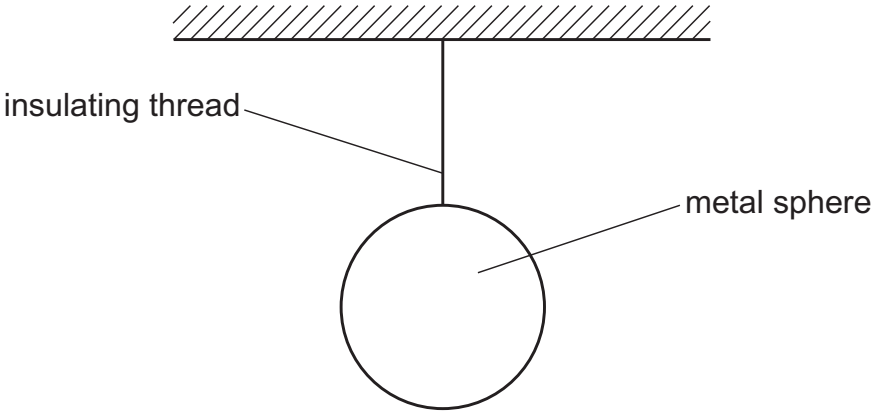

Fig. 6.1

The sphere is negatively charged.

(a) The charge on the sphere produces an electric field in the surroundings.

(i) State what is meant by 'electric field'.

.....

..... [1]

(ii) Draw on Fig. 6.1 to show the pattern and direction of the electric field produced by the charge on the sphere. Draw at least **four** lines. [3]

(b) The magnitude of the charge on the sphere is 3.5×10^{-10} C.

An earthed metal wire is touched against the surface of the sphere and the sphere is discharged.

(i) State what happens in the wire as the sphere is discharged.

.....

.....

..... [2]

(ii) It takes a time of 0.14 ns for the sphere to discharge completely.

Calculate the average current in the earthed wire as the sphere discharges.

average current = ... [3]

[Total: 9]