8 **(a)** State what is meant by *quantisation* of charge.

.....

..... [1]

(b) A student carries out an experiment to determine the elementary charge.
A charged oil drop is positioned between two horizontal metal plates, as shown in Fig. 8.1.

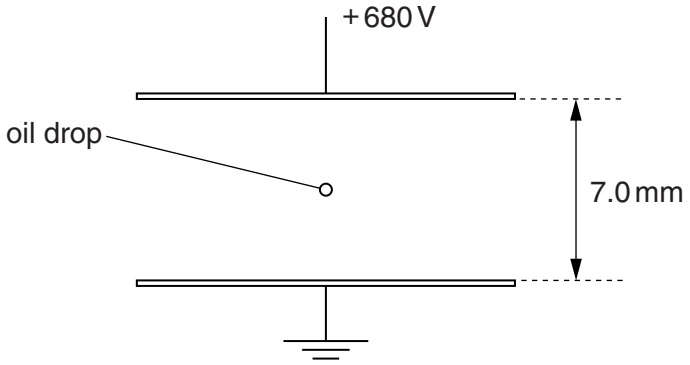

Fig. 8.1

The plates are separated by a distance of 7.0 mm. The lower plate is earthed.
The potential of the upper plate is gradually increased until the drop is held stationary. The potential for the drop to be stationary is 680 V.
The weight of the oil drop, allowing for the upthrust of the air, is 4.8×10^{-14} N.
Calculate the value for the charge on the oil drop.

charge = ... C [2]

(c) The student repeats the experiment and determines the following values for the charge on oil drops.

$3.3\times10^{-19}\,C$ $4.9\times10^{-19}\,C$ $9.7\times10^{-19}\,C$ $3.4\times10^{-19}\,C$

Use these values to suggest a value for the elementary charge. Explain your working.

elementary charge = ... C [2]