Potential acquired in 184·6 secs by plate N with saturation current $= \cdot 75$ volts or $\cdot 75/300$ E. S. Units.

Capacity of electrical system=2411 cms.

$$\text{Charge acquired per sec.} = \frac{\cdot 75 \times 2411}{300} \times \frac{1}{184\cdot 6} \text{ E. S. U.}$$

$$\therefore \text{No. of ions} = \frac{\cdot 75 \times 2411}{300} \times \frac{1}{184\cdot 6} \times \frac{1}{4\cdot 65 \times 10^{-10}}$$

$\therefore N_1$=No. of α particles = emitted per sec.

$$= \frac{\cdot 75 \times 2411}{300} \times \frac{1}{184\cdot 6} \times \frac{1}{4\cdot 65 \times 10^{-10}} \times \frac{1}{1\cdot 62 \times 10^5} = 433.$$

Calculation II. Determination of number of δ particles emitted per second.

Initial rate of increase in potential of plate N and attached electrical system=·107 volts per hour.

Capacity of electrical system=260 cms.

$$\text{Positive Charge acquired per second} = \frac{\cdot 107}{300} \times \frac{1}{3600} \times 260 \text{ E. S. U.}$$

$\therefore$ No of Elementary units of Electricity gained per sec.

$$= \frac{\cdot 107}{300} \; \frac{1}{3600} \; \frac{260}{4\cdot 65 \times 10^{-10}}$$

$$= 53170$$

Let N_2 denote the number of delta particles leaving the plate N per second, then if each delta particle carried a negative charge of $4\cdot 6 \times 10^{-10}$ E. S. U. and each α particle carried a positive charge of twice this amount we have

$$N_2 - 2N_1 = 53170$$
$$\text{or } N_2 = 53170 + 2N_1$$
$$= 53170 + 866$$
$$= 54036$$

It follows then that $\dfrac{N_2}{N_1} = \dfrac{54036}{433} = 124\cdot 8$