285.

Problem 27.31 (RHK)

We have to calculate the number of coulombs of positive charge in a glass of water. We may assume that the volume of water in the glass is 250 cm^3 .

Solution:

Mass of 250 cm³ of water will be 250 g. Amount of positive charge in each molecule of water, H₂O, is $10e = 10 \times 1.6 \times 10^{-19}$ C, as number of protons in aH₂O molecule are 2+8. The number of H₂O molecules in 18 g of water are equal to the Avogadro's number, 6.02×10^{23} . Therefore, the number of H₂O molecules in 250 g of water will be

$$N = \frac{6.02 \times 10^{23} \times 250}{18} = 8.36 \times 10^{24}.$$

Therefore, the total positive charge in coulombs in 250 cm³ of water will be

$$Q = 8.36 \times 10^{24} \times 1.6 \times 10^{-18} \text{ C} = 1.34 \times 10^{7} \text{ C} = 13.4 \text{ MC}.$$