Some exercises on dissolution and dilution

Glucose and concentration

A glucose ($C_6H_{12}O_6$) solution has a molar concentration $C = 5.00 \times 10^{-2}$ mol.L^{-1}.

1. **What is the mass of glucose needed to prepare a volume V = 200 mL of this solution?**
2. **What volume of the previous solution should we take to obtain a volume V' = 100 mL of a glucose solution of concentration C' = 1.00x10^{-2} mol.L^{-1}?**
   Write the method to prepare this solution, with the precise glassware needed.

"A boost of energy"

On a tube of vitamin C, it is written « Vitamin C of 300 g of oranges in 1 tablet »
A tablet contains a mass m = 148 mg of vitamin C (AKA ascorbic acid).

1. **What molar quantity of vitamin C does the tablet contain ?**
2. **If a tablet is dissolved in a volume V = 250 mL of water, what is the molar concentration of ascorbic acid in the solution?**

Oranges are pressed so that a volume V' = 220 mL of juice is obtained. The molar concentration of vitamine C in this juice is measured to be C' = 2.55×10^{-3} mol.L^{-1}.

3. **Determine the mass of oranges that have been pressed.**

Copper sulphate

We wish to prepare a volume V = 100 mL of a copper sulphate solution of concentration in copper ions $[Cu^{2+}]_d = 5.0 \times 10^{-3}$ mol.L^{-1} from a stock solution in which the concentration in copper ions is $[Cu^{2+}] = 1,0.10^{-1}$ mol.L^{-1}.

1. **Determine the volume of stock solution that has to be taken.**
2. **Describe the method accurately.**

Data :
M(H) = 1.00 g.mol^{-1}; M(C) = 12.0 g.mol^{-1}; M(O) = 16.0 g.mol^{-1}
Formula of ascorbic acid: $C_6H_8O_6$