

Answer on the question #47513, Chemistry, Inorganic Chemistry

Question:

A laboratory test for gastric acidity calls for 0.1 NaOH. Prepare 40.0mL of a 10X stock solution of this reagent using two NaOH solutions, one labeled 20% and the other 0.75N. How much 20% NaOH and 0.75N NaOH must be mixed together to produce 40.0mL of 10X stock?

Solution:

The concentration of the stock solution is:

$$c = 0.1 * 10 = 1 \frac{\text{mol}}{\text{L}}$$

Let's consider 20% solution as solution 1, and then 0.75N is solution 2. Also, the number of moles of NaOH, as for the volume (let's consider density of solutions remains constant) is the sum of the ones supplied by solutions 1 and 2:

$$cV = c_1V_1 + c_2V_2$$

$$V = V_1 + V_2$$

Let's consider first solution concentration as w/v (weight to volume, g/mL) one. According to that:

$$c_1V_1 = n_1 = \frac{w}{M(\text{NaOH})} V_1 = \frac{0.2 * 1000}{39.99711} V_1$$

$$c_2V_2 = 0.75V_2$$

Then: $V_1 = 2.35 \text{ mL}$, $V_2 = 40 - 2.35 = 37.65 \text{ mL}$

Answer: $V_1 = 2.35 \text{ mL}$, $V_2 = 37.65 \text{ mL}$