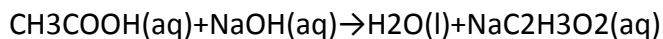


Answer on Question #62392, Chemistry / General Chemistry

Problem 3.84 (Chapter 4)

The distinctive odor of vinegar is due to acetic acid, CH_3COOH , which reacts with sodium hydroxide in the following fashion:



1) If 3.50 mL of vinegar needs 45.0 mL of 0.110 M NaOH to reach the equivalence point in a titration, how many grams of acetic acid are in a 1.90 qt sample of this vinegar?

Solution:

$$0.045 \text{ liters} \times 0.110 \text{ M} = 0.00495 \text{ moles of NaOH}$$

$$0.00495 \text{ moles of NaOH} = 0.00495 \text{ moles of acetic acid}$$

$$1 \text{ quart} = 32 \text{ fl oz}$$

$$1 \text{ fl oz} = 29.57 \text{ mL}$$

$$1.90 \text{ quarts} \times 32 \text{ fl oz/qt} \times 29.57 \text{ mL/fl oz} = 1797.9 \text{ mL}$$

$$0.00495 \text{ moles} / 3.50 \text{ mL} = 1.414 \times 10^{-3} \text{ moles/mL}$$

$$1.414 \times 10^{-3} \text{ mol/mL} \times 1.7979 \times 10^3 \text{ mL} = 2.54 \text{ mol}$$

$$2.54 \text{ mol} \times 60.05 \text{ g/mol} = 152.5 \text{ g}$$

152.5 g CH_3COOH per 1.90 quarts

Answer: 152.5 g