

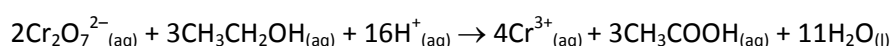
Friday Worksheet
Volumetric analysis worksheet 7

Name:

A 11.00 gram sample of Vodka was analysed for its alcohol content. The sample was placed in a 300 mL volumetric flask and made to the mark with distilled water. A 20.0 mL aliquot of the diluted Vodka was taken from the volumetric flask and placed in a conical flask containing some distilled water from a previous washing.

The 20.0 mL aliquots were titrated against a 0.140 M $\text{Cr}_2\text{O}_7^{2-}$ solution and an average titre of 12.32 mL was obtained.

The reaction between the alcohol and the dichromate solution is given below



- a) Calculate the amount in mol of $\text{Cr}_2\text{O}_7^{2-}$ in the average titre.

$$n = C \times V = 0.140 \times 0.01232 = 0.001725$$

- b) Calculate the amount, in mol, of $\text{CH}_3\text{CH}_2\text{OH}$ in the conical flask

$$n = 0.001725 \times (3/2) = 0.00259$$

- c) Calculate the amount, in mol, of $\text{CH}_3\text{CH}_2\text{OH}$ in the volumetric flask.

$$n = 0.00259 \times (300/20) = 0.0389$$

- d) Calculate the amount, in mol, of alcohol in the sample of vodka

$$0.0389$$

- e) Calculate the percentage, by mass, of ethanol in the vodka.

Step 1 Calculate the mass of ethanol in 23.0 grams of Vodka

$$\Rightarrow 0.0389 \times M_{\text{ethanol}} = 0.0389 \times 46.1 = 1.79 \text{ grams}$$

Step 2 Find the percentage by mass of ethanol.

$$\Rightarrow (1.79/11.00) \times 100 = 16.3\%$$

- f) What will be the impact on the calculation of the final result of having water in the conical flask?

No impact on the result.