

## REDOX TITRATIONS – TOPIC TEST 2

### QUESTION 1

Of the following, identify the redox reaction:

- A  $C(s) + O_2(g) \rightarrow CO_2(g)$
- B  $Ag^+(aq) + Cl^-(aq) \rightarrow AgCl(s)$
- C  $6HCl(aq) + Al_2O_3(s) \rightarrow 2AlCl_3(aq) + 3H_2O(l)$
- D  $CH_3COOH(aq) + NaOH(aq) \rightarrow CH_3COONa(aq) + H_2O(l)$

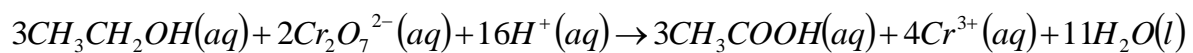
### QUESTION 2

A student carried out a series of experiments in a school laboratory. From the information given, identify the redox titration. Hence determine the experiment that would require a titration reaction written by first writing the appropriate half equations.

- A A sample of hydrochloric acid, HCl, was titrated against a solution of barium hydroxide, Ba(OH)<sub>2</sub>. The products of the reaction were barium chloride and water.
- B A sample of hydrochloric acid was titrated against a solution of sodium carbonate. The products of the reaction were sodium chloride, carbon dioxide and water.
- C A solution containing ammonium ions, NH<sub>4</sub><sup>+</sup>, was added to excess sodium hydroxide. The products of the reaction were ammonia, NH<sub>3</sub>, and water.
- D A sample of oxalic acid, H<sub>2</sub>C<sub>2</sub>O<sub>4</sub>, was titrated against acidified potassium permanganate, KMnO<sub>4</sub>. The products of the reaction were Mn<sup>2+</sup> and carbon dioxide.

**QUESTION 3**

The alcohol content of a particular sample of wine was found by titration. A 20.00 ml sample of the wine was pipetted into a conical flask and titrated against a 0.0500 M solution of potassium dichromate,  $K_2Cr_2O_7$ . An average titre of 21.45 ml was obtained. Calculate the concentration of alcohol in the wine in  $g L^{-1}$ , if the equation for the reaction was:

**Solution**

**QUESTION 4**

In order to determine the percentage of iron in a piece of wire, a 0.901 g sample of the wire was dissolved in excess hydrochloric acid. The resulting solution containing  $\text{Fe}^{2+}$  ions was made up to 200.0 ml in a volumetric flask. A pipette was used to transfer 25.00 ml aliquots into four conical flasks, and each aliquot of the dilute solution was titrated against a 0.0200 M solution of potassium permanganate. An average titre of 18.75 ml was obtained, and the resulting solution of  $\text{Fe}^{3+}$  and  $\text{Mn}^{2+}$  ions was almost colourless. Calculate the percentage purity of iron in the sample of wire.

***Solution***

## **ANSWERS**

**QUESTION 1**      Answer is A

**QUESTION 2**      Answer is D

**QUESTION 3**      3.70 g L<sup>-1</sup>

**QUESTION 4**      93.1 % (m/m)