

Net ionic equations, titration and redox

AP Chemistry · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test lasts 45 minutes and is worth 20 points. Write balanced equations with states, show all steps of calculations and use units. In explanations, refer to the particles and the stoichiometry.

Level: AP Chemistry · **Curriculum:** AP Chem Unit 4

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Oxidation numbers (2 marks)

State the oxidation number of Mn in KMnO_4 and of S in H_2SO_3 .

Question 2 Net ionic equation (3 marks)

Write the balanced net ionic equation for the reaction of aqueous silver nitrate with aqueous sodium carbonate, which forms a precipitate of Ag_2CO_3 .

Question 3 Predict precipitates (2 marks)

Will a precipitate form on mixing aqueous solutions of (a) KCl and $\text{Pb}(\text{NO}_3)_2$, (b) NaNO_3 and CaCl_2 ? Name any precipitate.

Question 4 Titration calculation (3 marks)

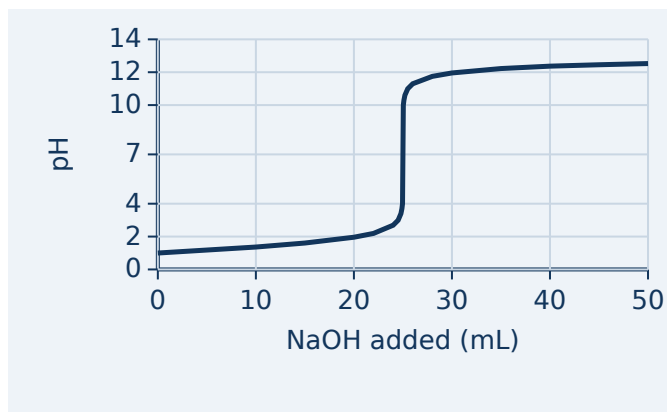
A 20.00 mL sample of KOH requires 15.60 mL of 0.1200 M HCl to neutralise it. Calculate $c(\text{KOH})$.

Question 5 Limiting reagent (3 marks)

20.0 mL of 0.250 M BaCl_2 is mixed with 30.0 mL of 0.100 M Na_2SO_4 . Identify the limiting reagent and calculate the mass of BaSO_4 (233.39 g/mol).

Question 6 Redox agents (2 marks)

In $2\text{Al}(\text{s}) + 3\text{Cu}^{2+}(\text{aq}) \rightarrow 2\text{Al}^{3+}(\text{aq}) + 3\text{Cu}(\text{s})$, identify the oxidising agent and the reducing agent.

Question 7 Titration curve (3 marks)

Strong acid with strong base.

- State the volume and pH at the equivalence point. (1 mark)
- Calculate the concentration of the acid. (2 marks)

Question 8 Spectator ions (2 marks)

Explain what a spectator ion is and identify the spectator ions when HCl(aq) reacts with NaOH(aq) .