11 Qualitative Analysis

Set A **Answer key**

A From the lesson

7 MARKS

1 **B** calcium, Ca^{2+} [1]

The white precipitates of aluminium and zinc hydroxide dissolve in excess aqueous sodium hydroxide. Ammonium ions give no precipitate.

2 **B** iodide, I^- [1]

Silver iodide is yellow. Silver chloride is white, sulfate is tested with barium nitrate, and any carbonate is removed by the nitric acid.

3 **C** chlorine [1]

Chlorine is acidic and also bleaches. Ammonia turns red litmus blue, carbon dioxide is odourless, and sulfur dioxide is tested with acidified potassium manganate(VII).

4 **(a)** A red-brown precipitate, insoluble in excess. [1]

(b) Acidify with dilute nitric acid, then add aqueous barium nitrate: a white precipitate forms. [1]

(c) Hold a lighted splint at the mouth of the tube: it is extinguished with a pop. [1]

(d) Aqueous ammonia (in excess). [1]

B Practice

11 MARKS

5 **D** acidified potassium manganate(VII) turns from purple to colourless [1]

Sulfur dioxide turns acidified potassium manganate(VII) from purple to colourless. A is the test for oxygen and B is the test for chlorine.

6 **C** iron(II) nitrate [1]

The green precipitate shows iron(II) ions. No effervescence with nitric acid means no carbonate, and ammonia with aluminium foil shows nitrate ions.

7 **D** sodium nitrate [1]

No ammonia before the aluminium is added, so there are no ammonium ions. Ammonia after adding aluminium shows nitrate ions.

8 **B** add aqueous sodium hydroxide and warm [1]

Only ammonium nitrate gives ammonia when warmed with aqueous sodium hydroxide. With aluminium foil, both nitrates would give ammonia.

9 **B** 3 only [1]

Aqueous ammonia gives no change with either. Barium nitrate gives a white precipitate with both (barium sulfate and barium carbonate). Only hydrochloric acid gives effervescence, with the carbonate.

10 **C** calcium nitrate [1]

A white precipitate insoluble in excess shows calcium ions. Ammonia after adding aluminium shows nitrate ions.

11 **(a)** Add aqueous ammonia dropwise, then in excess: a green precipitate forms which is insoluble in excess. [1]

(b) $Fe^{2+}(aq) + 2OH^{-}(aq) \rightarrow Fe(OH)_2(s)$: correct ionic equation [1]

Correct state symbols [1]

12 **(a)** A light blue precipitate. [1]

(b) The light blue precipitate dissolves in excess aqueous ammonia, giving a dark blue solution. [1]