

1. Gaseous titanium(IV) chloride is produced and condensed into liquid state. The titanium(IV) chloride is then separated from liquid impurities. Suggest the name of the process by which liquid titanium(IV) chloride could be separated from liquid impurities.

Fractional distillation

2. Titanium(IV) chloride,  $\text{TiCl}_4$ , is heated with excess of magnesium, in an atmosphere of argon. Why?

Argon is unreactive/inert // magnesium burns in air/oxygen // magnesium reacts with oxygen/air

3. How does a chromatogram show that a substance is not pure?

More than one spot

4. Describe the test for a nitrate ion.

- add aqueous sodium hydroxide
- then (reduction with) aluminium foil and warm
- ammonia gas produced which turns damp red litmus blue

5. Saturated solution

- A solution that can dissolve no more solute
- At the specified/ given temperature

6.

Which piece of apparatus should be used to measure exactly  $21.4 \text{ cm}^3$  of water?

- A  $25 \text{ cm}^3$  beaker
- B  $25 \text{ cm}^3$  pipette
- C  $50 \text{ cm}^3$  burette
- D  $50 \text{ cm}^3$  measuring cylinder

Answer: C

7. A copper compound used to test for water:

Anhydrous copper (II) sulphate

8.

A student determines the concentration of a solution of dilute sulfuric acid,  $\text{H}_2\text{SO}_4$ , by titration with aqueous sodium hydroxide, NaOH.

**step 1** 25.0 cm<sup>3</sup> of 0.200 mol/dm<sup>3</sup> NaOH is transferred into a conical flask.

**step 2** Three drops of methyl orange indicator are added to the conical flask.

**step 3** A burette is filled with  $\text{H}_2\text{SO}_4$ .

**step 4** The acid in the burette is added to the conical flask until the indicator changes colour. The volume of acid is recorded. This process is known as titration.

**step 5** The titration is repeated several times until a suitable number of results is obtained.

**State how student decides that a suitable number of results have been obtained**

At least 2 of the results are within 0.2cm<sup>3</sup> or less.

9. **Describe how you would make a sample of limewater starting with solid calcium hydroxide**

- add excess (solid) calcium hydroxide (to water)
- Filter

10. **Describe how you test for the presence of calcium ions in sample of limewater**

- (aqueous) sodium hydroxide
- white precipitate
- insoluble / remains in excess

11. **Describe test for oxygen**

- Test: glowing splint
- Positive result: relights / rekindles

12. **Deduce what is seen when aqueous silver nitrate is added to aqueous sodium iodide.**

Yellow precipitate

13. **Limewater is aqueous calcium hydroxide. Write the formula of the white precipitate formed when limewater turns milky in presence of carbon dioxide.**

$\text{CaCO}_3$

NOTE: for test for hydrogen, state squeaky pop.

14. **Formula of hydrates copper (II) sulphate**

$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

**15. Describe a test for pure water**

- Boiling point
- Is 100°C

**16. Name the process when a solid substance mixes with a solvent to form a solution.**

Dissolving

**17. Sodium hydrogensulfate, NaHSO<sub>4</sub>, dissolves in water to produce an aqueous solution, X, containing Na<sup>+</sup>, H<sup>+</sup> and SO<sub>4</sub><sup>2-</sup> ions. State the observations when Copper(II) oxide is warmed with an excess of X**

- Solid dissolves/ disappears
- Blue solution