Grade 10 Chemistry

Practice exercise no. 4

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1. Calcium burns in air to form calcium oxide. The reaction is vigorous and some of the calcium oxide can be lost as smoke.
Plan an investigation to determine the maximum mass of oxygen that combines to form calcium oxide when 2g of calcium granules are burnt in air.
You are provided with common laboratory apparatus and calcium granules.

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2. Potassium sulfate is the salt produced when sulfuric acid is neutralised by potassium hydroxide solution.
The correct amount of potassium hydroxide solution must be added to neutralise all of the sulfuric acid.
Plan an experiment to obtain pure crystals of potassium sulfate from sulfuric acid and potassium hydroxide solution.
You are provided with common laboratory apparatus.

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3. Nickel sulfate-6-water, $NiSO_4.6H_2O$, is a blue crystalline salt.

Plan an experiment to obtain a sample of pure water from this salt. Your answer should include a diagram of the apparatus, any expected observations and a test to show the presence of pure water.
You are provided with common laboratory apparatus.

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4. Agri Limes are mixtures of calcium carbonate and calcium oxide. Farmers use Agri Limes on fields to neutralise acidity.

Plan an investigation to find out which of **two** different Agri Limes, **Q** or **R**, will neutralise more acid. You are provided with common laboratory apparatus and chemicals, including dilute nitric acid.

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5. Metal rings can be coated with a layer of copper using electricity.
Plan an experiment to electroplate a small metal ring with copper.
You are provided with common laboratory apparatus, a copper rod, copper(II) sulfate crystals, water and a small metal ring.
Include a labelled diagram in your answer.

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6. A liquid cleaner is a mixture of three substances. These substances are shown in the table.

name of substance	properties of substance
water	liquid, boiling point 100 °C
sodium carbonate	solid, soluble in water
silica	solid, insoluble in water

Plan an experiment to obtain separate pure samples of each substance from the mixture in the liquid cleaner. You are provided with common laboratory apparatus.

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7. A sample of furniture cleaner contains aqueous sodium chloride, aqueous ammonia and sand.

(a) Give a test to show the presence of ammonia in the mixture.

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(b) Plan an investigation to obtain a sample of

(i) pure water from the mixture, ...

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(ii) pure sand from the mixture. .....

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8. Calcium carbonate and kaolinite are both white solids found in sedimentary rocks.

Calcium carbonate reacts with dilute hydrochloric acid to form aqueous calcium chloride. Kaolinite does **not** react with dilute acids.

You are provided with a mixture of calcium carbonate and kaolinite and access to dilute hydrochloric acid.

Plan an experiment to determine the percentage by mass of calcium carbonate in the mixture.

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9. Cassiterite is a naturally occurring form of tin oxide.

Describe how you would

- obtain a sample of tin from a large lump of cassiterite in the laboratory,
- determine the percentage by mass of tin present in cassiterite.

Tin is similar in reactivity to iron.

Your answer should include any apparatus and chemicals used and the conditions required.

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