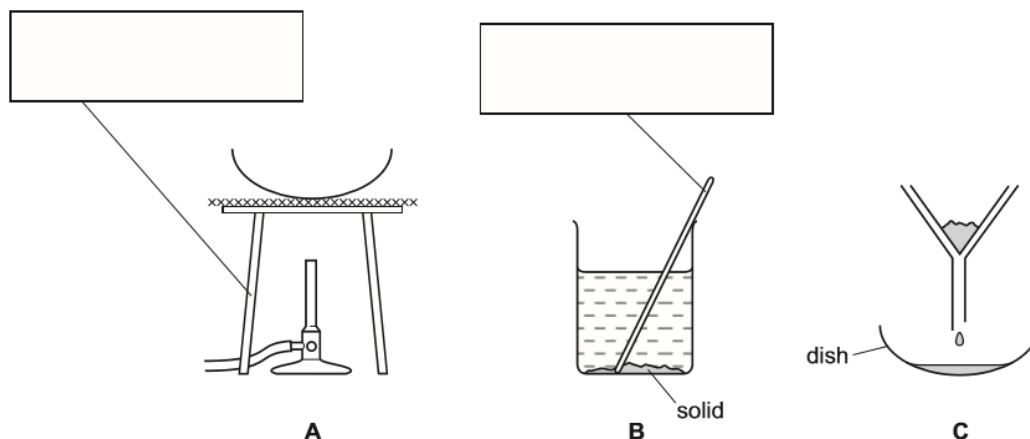


1. The diagrams show the apparatus used to obtain crystals of calcium chloride from a mixture of solid calcium chloride and solid calcium carbonate.

Calcium chloride is soluble in water and calcium carbonate is insoluble in water.



- a.** Complete the boxes to name the apparatus. [2]
- b.** (i) Write down the order in which the apparatus should be used in this experiment.  
..... [1]
- (ii) Name the separation process in **C**.  
..... [1]
- c.** (i) What has been added to the mixture in **B**?  
..... [1]
- (ii) What is the general name given to the liquid in the dish in **C**?  
..... [1]
- d.** How would you know when to stop heating the dish in **A**?  
..... [1]

[Total: 7]

**2.** 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 experiments to obtain separate pure samples of each substance from the mixture in the liquid cleaner. You are provided with common laboratory apparatus.

..[6]

[Total: 6]

3. The following techniques are used to separate mixtures.

### A simple distillation

### B fractional distillation

## C evaporation

## D chromatography

## E filtration

## F diffusion

From this list, choose the most suitable technique to separate the following.

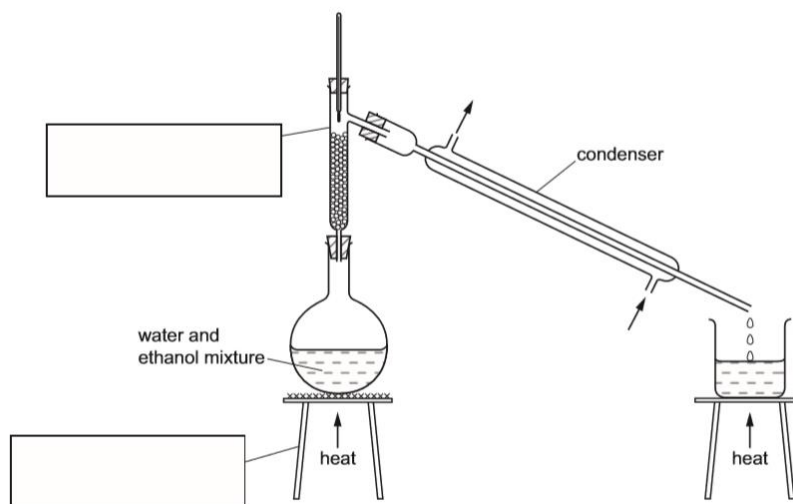
- (a) methane from a mixture of the gases, methane and ethane .....

[1]

- (b) water from aqueous magnesium sulfate ..... [1]
- (c) glycine from a mixture of the amino acids, glycine and lysine ..... [1]
- (d) iron filings from a mixture of iron filings and water ..... [1]
- (e) zinc sulfate crystals from aqueous zinc sulfate ..... [1]
- (f) hexane from a mixture of the liquids, hexane and octane ..... [1]

[Total: 6]

4. The diagram shows the apparatus used to separate a mixture of water, boiling point 100 °C, and ethanol, boiling point 78 °C.



- a. Complete the boxes to name the apparatus. [2]
- b. Label the arrows on the condenser. [1]
- c. Identify **one** mistake in the apparatus. [1]
- d. Which liquid would collect first? Explain your answer. [2]
- e. Why would it be better to use an electrical heater instead of a Bunsen burner to heat the water and ethanol mixture? [1]

[Total: 7]