

Question 40 (Answer: **A**)

- Ethanol and water mix completely, so filtering achieves nothing.
- They boil at different temperatures, 78 °C and 100 °C.
- A fractionating column separates them by repeated evaporation and condensation.

3(a)	$\rightarrow \text{BaSO}_4(\text{s}) + 2\text{NaCl}(\text{aq})$ M1 2NaCl (only) M2 (s) and (aq)
3(b)	M1 $M_r \text{BaCl}_2 = 208$ M2 $208 \times 0.1 = 20.8$
3(c)	$0.100 \div 1.25 (\times 1000) = 80 \text{ (cm}^3\text{)}$
3(d)	white
3(e)	residue
3(f)	M1 rinsing the residue (with water) M2 (mass was greater) because (dry) residue contains solid sodium chloride / NaCl adds to the mass (of residue)
3(g)	precipitation
3(h)	M1 named soluble barium salt other than barium chloride e.g. (barium) nitrate M2 named soluble sulfate salt other than sodium sulphate e.g. potassium (sulfate) / ammonium (sulfate) M3 named insoluble barium salt other than barium sulfate e.g. (barium) carbonate

Question 39 (Answer: **C**)

- The salt is already dissolved, so there is nothing to filter out.
- Evaporating some of the water gives a saturated solution that crystallises on cooling.
- Chromatography separates mixtures and condensation collects a distillate instead.

Question 39 (Answer: **D**)

- Filtration separates an insoluble solid from a solution.
- The solid caught in the filter paper is the residue.
- The liquid that passes through is the filtrate – and it is a solution, not pure water.

Question 40 (Answer: **B**)

- Dissolving a solute widens the range over which a substance stays liquid.
- So the melting point falls *below* -114°C .
- And the boiling point rises *above* 78°C .

Question 38 (Answer: **D**)

- Add the mixture to a solvent that dissolves only the soluble solid.
- Filter to leave the insoluble solid as the residue.
- Then evaporate or crystallise the filtrate to recover the soluble solid.

Question 39 (Answer: **A**)

- Liquids with different boiling points are separated by distillation.
- That needs a flask to heat the mixture, a thermometer at the neck, and a condenser.
- Electrolysis apparatus and filter funnels do not separate by boiling point.