GCSE Chemistry A (Gateway Science)

J248/01 Chemistry A C1-C3 and C7 (Foundation Tier)

Question Set 16

1 A student is separating some mixtures. She wants to make pure water from a solution of salt water. She filters the mixture.

Her method does not work.

(a) Explain why her method does not work and describe the method she should use.

[2]

Salt is dissolved in water thus filteration would not work (salt is not in solid state). Pure water can be obtained by distillation because water has lower boiling point than salt.

(b) The student wants to separate a mixture of two liquids.

The liquids are:

Liquid	Boiling point (°C)
Water	100
Ethanol	78

Which separation technique should she use?

Explain how the method works. **[2]**

fractional distillation which is boiling the mixture to a precise temperature (78°C) to only evaporate ethanol from the mixture (this works because they have different boiling points) then condense the ethanol gas back to liquid state once separated.

(c) The student separates two solid substances **A** and **B**. She wants to check that they are **pure**.

(i) What is meant by a **pure solid**?

[1]

Only one type of compound/solid (either A or B) being present.

(ii) The student measures the melting points of four samples of solid **A**.
Look at her results.

Sample	Melting point (°C)
1	115
2	119
3	114–118
4	120–122

She knows that a pure sample of solid **A** has a melting point of 120 °C.

She concludes that sample 4 is the purest sample of solid **A**.

Do the results support her conclusion?

Explain your answer using evidence from the table. **[3]**

The results do not support her conclusion because pure sample should have one melting temperature (impure substance has a range of melting temperature like sample 4 with a range of 120–122 °C). Furthermore, pure sample cannot melt at a temperature lower than the melting point indicating impurities in a sample lower the samples melting temperature. Thus, samples with relatively lower melting points (e.g. 1 and 3) are impure. As a result, sample 2 is the purest sample as it's the closest boiling point to 120 °C without variation. The difference by 1 °C could be due to slightly inaccurate temperature readings.

Total Marks for Question Set 16: 8