

GCSE Chemistry A (Gateway Science)
J248/03 C1-C3 and C7 Higher (Higher Tier)

Question Set 15

1 A student has a mixture of three substances.

Look at some information about these substances.

Substance	Melting point (°C)	Boiling point (°C)	Solubility in water
Sand	1710	2230	Insoluble
Sodium chloride	801	1413	Soluble
Water	0	100	

(a) Describe how the student can separate the mixture to get pure samples of all **three** substances.

Explain why each method of separation works.

[4]

(See below)

(b) The student separates two solid substances **A** and **B**.

She wants to check that they are **pure**.

She measures the melting points of four samples of solid **B**.

Look at her results.

Sample	Melting point (°C)
1	109
2	105
3	104–108
4	110–112

The student knows that a pure sample of solid **B** has a melting point of 110°C.

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

Do the results support her conclusion?

Explain your answer using evidence from the table.

[3]

Total Marks for Question Set 15: 7

No because sample 4 has range higher than 110°C. Pure sample of B cannot have melting point above 110°C. Also pure samples do not melt over a range of temperature (have one specific melting point). Plus, impurities (like sample 3) have a lower melting point. As a result, sample 1 is likely to be most pure.

The Periodic Table of the Elements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1 H hydrogen 1.0	2 He helium 4.0																
3 Li lithium 6.9	4 Be beryllium 9.0	5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2	11 Na sodium 23.0	12 Mg magnesium 24.3	13 Al aluminum 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9		
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3
55 Cs cesium 132.9	56 Ba barium 137.3	57-71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium	85 At astatine	86 Rn radon
87 Fr francium	88 Ra radium	89-103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium	113 Nh nihonium	114 Fl flerovium	115 Mc moscovium	116 Lv livermorium	117 Ts tennessine	118 Og oganeson

Key
 atomic number
Symbol
 name
 relative atomic mass

1. a) - Filter to remove the sand as sand is insoluble in water
- Distil the filtrate
 - Solid sodium chloride stays in flask and pure water condenses.

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