Question 1

1(a)	electrons: 62 (1) neutrons: 92 (1)	2
1(b)	4th box down ticked (Samarium has a high density.)	1

Question 2

2(a)	B and D (1) have coloured chlorides / have coloured compounds (1) have high melting points (1)	3

Question 3

3(a)	1 mark each for any two of: • iron has a high(er) melting point / boiling point • iron has a high(er) density • iron is strong(er) • hard(er)	2

Question 4

4(f)	copper(II) chloride	1

Question 5

5(d)	Any **two** from: • Co has high melting point / boiling point **ORA** for Li • Co has high density **ORA** for Li • Co has catalytic activity **ORA** for Li • Co forms coloured compounds **ORA** for Li • Co compounds have variable oxidation states / form ions with different charges **ORA** for Li • Co is hard / Co is strong **ORA** for Li • Co less reactive **ORA** for Li / Li reacts rapidly with water / Co does not react with water / Co reacts slowly with water • Co is magnetic **ORA** for Li	2

Question 6

6(a)	one mark each for any two of: • nickel has high(er) density or reverse argument for sodium • nickel forms coloured compounds or reverse argument for sodium • nickel hard(er) or reverse argument for sodium	2

Question 2

Question 7

7(c)(i)	high melting point	1
7(c)(ii)	(act as) catalysts	1

Question 8

8(a)	form coloured compounds / ions	1
	act as catalysts	1

Question 9

9(a)	the **rate** of forward reaction equals the rate of the reverse reaction (1) **concentrations** of reactants and products are constant (1)	**2**

9(d)	cobalt (1) transition element (1)	**2**

Question 10

10(b)	Group I element is less strong / not strong **ORA** **OR** Group I element has low(er) density **ORA** **OR** Group I element is soft(er) **ORA**	**1**