

Question 1

1(f)(i)	(substance) chemically combined with water	1
1(f)(ii)	high melting point / high boiling point (1) conducts electricity when molten / conducts electricity when in aqueous solution (1)	2

Question 2

2(a)	high melting point (1) conducts electricity when molten / conducts electricity in aqueous solution (1)	2
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Question 3

3(d)	O	1
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Question 4

4(a)	(strong) electrostatic attraction (1) between oppositely charged ions (1)	2
4(b)	2 electrons in shell of Li only (1) + / 1+ charge outside brackets (1)	2

Question 5

5(a)(iv)	C	1
5(b)	number of electrons in O^{2-} ion = 10	1
	number of neutrons in S = 18	1
	number of protons in S = 16 AND in O^{2-} = 8	1

Question 6

6(a)	diamond does not conduct	1
	sulfur does not conduct	1
6(c)(i)	strong force of attraction	1
	between + and - ions / between oppositely charged ions	1
6(c)(ii)	does not conduct when solid but conducts when molten	1
	higher boiling point	1

Question 7

7(a)(iii)	C	1
7(b)	number of electrons in Rb ion: = 36 (1) number of neutrons in U = 143 (1) number of protons in U = 92 AND number of protons in Rb ion = 37 (1)	3

Question 8

8(a)(i)	boiling point of Na any values between 800 and 1300 (°C) (inclusive of these values) (1) hardness of Li: any value <u>above</u> 0.70 (MPa) up to a maximum of 5.0 (MPa) (1)	2
8(a)(ii)	liquid (1) 200 °C is above the melting point and below the boiling point / 200 °C is between the melting and boiling points (1)	2
8(d)	high boiling point / high melting point (1) soluble in water (1)	2

Question 9

9(a)(v)	Cl ⁻	1
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Question 10

10(f)	M1 8 crosses in third shell of Ca M2 7 dots and 1 cross in third shell of both Cl M3 '2+' charge on Ca on correct answer line AND '-' charge on both Cl ions on correct answer line	3
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Question 11

11(a)(i)	M1 Na with 2,8 all crosses (1) M2 O with 2,8 outer shell with 6 dots and 2 crosses (1) M3 + AND 2-(1)	3
11(a)(ii)	Na ₂ O	1
11(c)(i)	M1 positive ions and negative ions (1) M2 strong attraction / strong bonds (1)	2

Question 12

12(f)(i)	2Al + 3F ₂ → 2AlF ₃ M1 Al and F ₂ as reactants (1) M2 equation correct (1)	2
12(f)(ii)	M1 eight crosses in second shell of Al (1) M2 7 dots and 1 cross in second shell of F (1) M3 3+ charge on Al ion on correct answer line and - charge on F ion on correct answer line (1)	3

Question 13

13(d)(i)	Mg shown with new outer shell with 8 crosses	1
	both Cl with new outer shells each with 7 dots and 1 cross	1
	'2+' charge on Mg AND '-' charge on each Cl	1
13(d)(ii)	high melting point or high boiling point	1
	good electrical conductivity when aqueous OR good electrical conductivity when molten	1

Question 14

14(b)	eight crosses in second shell of Mg 7 dots and 1 cross in third shell of both Cl 2+ charge on Mg and – charge on both Cl ions on correct answer line	3
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Question 15

15(b)(i)	ionic	1
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15(b)(ii)	ions move / ions are mobile / ions flow	1
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Question 16

16(b)(i)	any two (one from each bullet point) <ul style="list-style-type: none"><i>physical constants</i>: high boiling point / melting point<i>conductivity</i>: conduct electricity when aqueous / conduct electricity when molten<i>solubility</i>: soluble in water	2
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16(b)(ii)	M1 eight dots in third shell of both K (1) M2 six crosses and two dots in third shell of S (1) M3 '+' charge on each K on correct answer line and '2-' charge on S ion on correct answer line (1)	3
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