(Electrolysis (including of aqueous solutions, half-equations))

Q1.a) (2018)

3.6 (cm^3)

Q1.b) (2018)

hydrogen line only

Q1.c) (2018)

both lines

Q2.a) (2018)

graphite has delocalised electrons

Q2.b) (2018)

cathode	**anode**
zinc (1)	chlorine (1)
hydrogen (1)	bromine (1)

Q3.a) (2020)

(negative electrode) solid produced

(positive electrode) bubbles / fizzing / effervescence

Q3.b) (2020)

potassium nitrate

hydrogen is not a metal

Q3.c) (2020)

(graphite) conducts (electricity)

(graphite) is inert

Q4. (2020)

the ions move towards the positive electrode

the electrode attracts ions of the opposite charge

Q5.a)(2021)

by filtration

Q5.b)(2021)

10 minutes per 2 cm on x-axis

all points plotted correctly

line of best fit

Q5.c)(2021)

0.14 (g)

Q6. (2021)

(copper sulfate solution)
pink / orange / red / brown solid

(sodium chloride solution)
bubbles / effervescence / fizzing

Q7.(2021)

toxic / poisonous (fumes)

Q8.(2021)

Molten compound electrolysed	**Product at the negative electrode**	**Product at the positive electrode**
(zinc chloride)	zinc (1)	chlorine (1)
potassium iodide	(potassium)	(iodine)

Q9.a)(2022)

hydroxide ions

Q9.b)(2022)

27 (cm^3)

Q9.c)(2022)

ions cannot move (freely in a solid)

Q10. (2022)

Molten compound	**Product at negative electrode**	**Product at positive electrode**
Potassium iodide	Potassium	**Iodine**
Zinc bromide	**Zinc**	Bromine

Q11. (2022)

carbon is less reactive than sodium

Q12. (2022)

(I)

Q13. (2022)

(percentage atom economy =)
$\frac{48}{80} \times 100$

= 60 (%)

Q14.(2023)

the ions can move (in the liquid)

Q15.(2023)

Molten compound	Product at the negative electrode	Product at the positive electrode
Magnesium bromide	Magnesium	**Bromine**
Potassium chloride	**Potassium**	Chlorine

Q16.(2023)

the mixture has a lower melting point than pure aluminium oxide

Q17.(2023)

water

Q18.(2023)

the volume of hydrogen is twice the volume of oxygen

Q19.(2024)

ions can move through the molten substance to the electrodes

Q20.(2024)

Molten compound	Product at negative electrode	Product at positive electrode
Lead chloride	**Lead**	Chlorine
Potassium iodide	Potassium	**Iodine**
Zinc bromide	Zinc	Bromine

Q21. (2024)

$$2\,Al_2O_3 \rightarrow 4\,Al + 3\,O_2$$