Question Number	Answer	Additional Guidance	Mark
2(b)	An answer that makes reference to one of the following points: • (Mg is) not in contact with hydrochloric acid/HCl((aq)) **or** hydrochloric acid/HCl((aq)) has not yet diffused (down burette)	Accept (Mg is) only in contact with water Allow (Mg) does not react / reacts slowly with water Allow (Mg is) not in contact with reactant(s) Ignore just water is at the top (of the burette) Ignore (Mg has) magnesium oxide coating / (Mg) does not react until magnesium oxide coating removed Ignore slow rate Do not award small surface area (of Mg) Allow contents of burette are not mixed / homogeneous Allow takes time for acid/mixture to reach Mg Ignore takes time for the liquids to switch places Ignore takes time for the reaction to start Ignore hydrochloric acid/HCl((aq)) is too dilute Ignore hydrochloric acid is more dense than water Do not award hydrochloric acid is less dense than water	**1**

Question Number	Answer	Additional Guidance	Mark
2(c)	• burette reading in Step 4 **and** burette reading in Step 5 **(1)** • volume of hydrogen gas **(1)**	Ignore units, even if incorrect 46.25 **and** 10.7(0) Do not award any other answers (= 46.25 – 10.70 =) 35.55 TE on M1 provided answer is to 2 d.p.	**2**

Question Number	Answer	Additional Guidance	Mark
2(d)	• moles (of hydrogen = moles Mg) **(1)** • volume of 1 mol of hydrogen gas in cm^3 **(1)**	<u>Example of calculation</u> = 0.030 ÷ 24.3 = 0.0012346 / 1.2346×10^{-3} (mol) Allow 0.00125 / 1.25×10^{-3} from $A_r = 24$ Do not award moles of HCl = 2 × 0.0012346 = 0.0024691 = 35.55 ÷ 0.0012346 = 28796 (cm^3) / 2.8796×10^4 (cm^3) Allow 28.796 dm^3 / 28.796 L Ignore SF except 1SF TE on 2(c) TE on M1 Correct answer with some working scores (2)	**2**

Question Number	Answer	Additional Guidance	Mark
2(e)	An explanation that makes reference to the following points: • moles of magnesium/Mg (reacting) would be smaller **or** moles of hydrogen (used in calculation) would be too high **(1)** • (cannot account for difference and) effect on (calculated) volume of 1 mole of hydrogen gas **(1)**	Allow mass for moles Allow just less magnesium/Mg (reacting) Allow moles/mass of magnesium/Mg used **in calculation** would be too high Allow actual mass of magnesium could be (as low as) 0.0294 (g) Allow actual moles of magnesium could be (as low as) 0.0012099 Allow less hydrogen produced (in reaction) Do not award can account for difference (calculated molar) volume would be (even) higher Allow (calculated molar) volume could be (as high as) 29383 (cm^3) Allow answer for volume If no other marks awarded, (cannot account for difference and) difference between calculated and Data Book values is greater than 2% scores (1)	**2**

Question Number	Answer	Additional Guidance	Mark
2(f)(i)	• percentage uncertainty in mass	Example of calculation (= $\frac{(2 \times 0.0025)}{0.030} \times 100$ =) 16.667 (%) Ignore SF except 1SF Correct answer with no working scores (1) Do not award any other answer	**1**

Question Number	Answer	Additional Guidance	Mark
2(f)(ii)	An answer that makes reference to the following point: • volume of hydrogen/gas (produced) would be greater than burette volume	Allow volume of hydrogen/gas (produced) too large Allow just too much hydrogen/gas produced Allow titre too large / cannot be measured by burette / capacity of burette too small Allow not enough space (in burette) for hydrogen/gas Allow 71.1(0) cm^3 is greater than 50 cm^3/burette (volume) Do not award hydrogen/gas produced too quickly Do not award any reference to magnesium being in excess / hydrochloric acid being limiting	**1**

(Total for Question 2 = 12 marks)