Question	Marking Guidance	Mark	Comments
03.1	Selects correct titres $\text{mean titre} = \frac{9.75 + 9.65}{2}$ = 9.7(0) cm^3 mol HCL = 0.102 × $^{9.70}/_{1000}$ = 9.89×10^{-4} (allow 9.9x10-4 for M3 but check not via 4 titres in which case only 1 mark)	1 1 1	If 3 or more titres used them MAX 1 for conseq M3 Calculates mean Calculates mol (working or result gains credit) 9.92×10^{-4} scores 1 if all 4 titres used 9.83×10^{-4} scores 1 if titres 1,2,and 3 used
03.2	mol $MHCO_3$ = ANS 3.1 x 10 (= 9.89×10^{-3}) $\text{Mr} = \frac{1464/1000}{M1}$ Mr = 148 (3sf)	1 1 1	Use ecf if wrong mean calculated above Allow ecf following wrong mass conversion
03.3	Suggestion: Use a larger mass of solid OR use a more concentrated solution of $MHCO_3$ OR less concentrated / more dilute solution of HCl OR more $MHCO_3$ Justification: So a larger titre/reading will be needed OR larger volume of HCl	1 1	 Cannot score justification mark unless suggestion correct, but suggestion could be after justification Assume reference to the solution means the $MHCO_3$

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03.4	This question is marked using levels of response. Level 3 - Must use volumetric flask to access level 3 Answer is communicated coherently and shows a logical progression from stage 1 to stage 2 then stage 3. 6 marks - All stages are covered and the description of each stage is complete 5 marks – all stages are covered but up to 2 omissions/errors from different stages. If 2 omissions/errors from same stage only level 2 possible Level 2 Answer is mainly coherent and shows progression from stage 1 to stage 3 4 marks - All stages are covered but 3 omissions/errors 3 marks – all stages are attempted Level 1 Answer includes isolated statements but these are not presented in a logical order or show confused reasoning. 2 marks – 2 stages attempted 1 mark – 1 stage attempted Level 0 0 marks Insufficient correct chemistry to gain a mark.	6	**Indicative Chemistry content** **Stage 1:** transfers known mass of solid a) Weigh the sample bottle containing the solid on a (2 dp) balance b) Transfer to beaker* and reweigh sample bottle c) Record the difference in mass Or d) Place beaker* on balance and tare e) Transfer solid into beaker f) Record mass Or g) Known mass provided h) Transfers (known) mass into beaker* i) Wash all remaining solid from sample bottle into beaker Allow use of weighing boat *Allow other suitable glassware including volumetric flask **Stage 2:** Dissolves in water a) Add distilled / deionised water b) Stir (with a glass rod) or swirl c) Until all solid has dissolved **Stage 3:** Transfer, washing and agitation a) Transfer to <u>volumetric / graduated</u> flask. Allow if a clear description/diagram given eg long necked flask with $250cm^3$ mark b) With washings c) Make up to $250cm^3$ / mark with water d) Shakes/inverts/mixes