

01. 0620_m21_ms_62 Q: 4

| Question | Answer | Marks |
|----------|--|-------|
| | any 6 from: 1 equal / known / stated mass of concrete 2 crush concrete / lumps 3 add excess hydrochloric acid THEN (mass left unreacted) 4 filter 5 wash and dry residue 6 find mass of residue 7 lower mass of residue has most calcium carbonate OR (volume of gas made by end / in a set time) 4 collect gas produced 5 suitable apparatus to collect gas and measure volume named/drawn 6 and measure volume / amount of gas formed 7 larger volume of gas means more calcium carbonate OR (mass lost) 4 place container on balance / weigh before 5 cotton wool in opening of container 6 measure mass loss / weigh after 7 bigger mass loss is more calcium carbonate OR (mass calcium chloride made) 4 filter 5 evaporate (filtrate) to dryness 6 measure mass solid calcium chloride 7 bigger mass is more calcium carbonate max 6 | 6 |

02. 0620_s14_ms_61 Q: 3

- (a) volumes of hydrogen completed correctly (3)
 0, 8, 34, 42, 46, 48, 48 [3]
guidance: 7 correct (3); 6 correct (2); 5 correct (1); 4 or fewer correct (0)
- (b) points plotted correctly including origin (3)
guidance: 7 correct (3); 6 correct (2); 5 correct (1); 4 or fewer correct (0)
- smooth curve missing anomalous point (1) [4]

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- (c) (i) point at $5 \text{ cm}^3 / 8 \text{ cm}^3 \text{ H}_2$ / second point (1) [1]
- (ii) leak / loss / escape of gas or wrong amount / too little HC / or zinc (1) [1]
allow: syringe sticking
- (iii) reading from graph (1) \pm half small square
 indication on graph (1) [2]
- (d) excess acid (1)
- all zinc reacted (1) [2]
allow: used up
- (e) sketch curve identical (2)
- different curve levelling out at 48 cm^3 (1) [2]
note: must be some indication of a second curve

03. 0620_s17_ms_61 Q: 2

| | | |
|---------|---|---|
| (a) | initial and final readings completed correctly: 4.1, 38.3 | 1 |
| | difference completed correctly: 34.2 | 1 |
| (b) | initial and final readings completed correctly: 3.7, 20.8 | 1 |
| | difference completed correctly: 17.1 | 1 |
| (c)(i) | solution C is more concentrated | 1 |
| | a greater volume of thiosulfate was needed | 1 |
| (c)(ii) | 2 <input type="checkbox"/> as concentrated | 1 |

| | | |
|---------|---|---|
| (d) | 1.5 <input type="checkbox"/> value from table in (b) for Experiment 2 | 1 |
| | unit: cm ³ | 1 |
| (e)(i) | 2 sources of error, e.g.: <input type="checkbox"/> using a measuring cylinder to measure solution C / solution D <input type="checkbox"/> only carrying out the experiments once <input type="checkbox"/> going past the end-point | 2 |
| (e)(ii) | 2 meaningful improvements related to (e)(i): <input type="checkbox"/> use a pipette / burette <input type="checkbox"/> repeat the experiment <input type="checkbox"/> improvement linked to going past the end-point | 2 |

04. 0620_s17_ms_62 Q: 4

| | | |
|--|---|---|
| | | 6 |
| | the filtration method any 6 from: <input type="checkbox"/> weigh mixture (of calcium carbonate and kaolinite) <input type="checkbox"/> add (dilute) hydrochloric acid <input type="checkbox"/> in excess / continue adding until there is no more fizzing / add until no more gas is evolved <input type="checkbox"/> filter <input type="checkbox"/> wash residue / kaolinite <input type="checkbox"/> dry <input type="checkbox"/> weigh residue / kaolinite <input type="checkbox"/> (change in mass / initial mass) <input type="checkbox"/> 100 (%) | |
| | the gas collection / loss of mass method any 6 from: <input type="checkbox"/> weigh mixture (of calcium carbonate and kaolinite) <input type="checkbox"/> add (dilute) hydrochloric acid <input type="checkbox"/> in excess / continue adding until there is no more fizzing / add until no more gas is evolved <input type="checkbox"/> collect gas in a syringe / measure final total mass <input type="checkbox"/> measure volume of gas / mass loss <input type="checkbox"/> calculate moles of CaCO ₃ / CO ₂ <input type="checkbox"/> calculate mass of CaCO ₃ <input type="checkbox"/> (mass of CaCO ₃ / initial mass) <input type="checkbox"/> 100 (%) | |
| | the calcium chloride method any 4 from: <input type="checkbox"/> weigh mixture (of calcium carbonate and kaolinite) <input type="checkbox"/> add (dilute) hydrochloric acid <input type="checkbox"/> in excess / continue adding until there is no more fizzing / add until no more gas is evolved <input type="checkbox"/> filter | 1 |

05. 0620_s21_ms_62 Q: 4

| Question | Answer | Marks |
|----------|---|-------|
| | any 6 from: <ul style="list-style-type: none"> • weighed sample / stated mass (e.g. 5 g) / known mass of epsomite • in a crucible • heated (strongly using a Bunsen burner / spirit burner) • reweigh • heat again, reweigh, continue until mass stops changing • calculate mass of water lost by original mass – final mass • calculate percentage water by $100 \times \text{mass water} / \text{original mass}$ | 6 |

06. 0620_w20_ms_63 Q: 4

| Question | Answer | Marks |
|----------|---|-------|
| | any 6 from: <ul style="list-style-type: none"> • weigh toothpaste • add (dilute) hydrochloric acid • to excess / until no more fizzing • filter • wash residue / silica (with water) and dry • weigh residue / silica • (mass silica / initial mass) $\times 100(\%)$ max 6 | 6 |