

QUESTIONSHEET 1

- (a) (i) lose one or more electrons 1
(ii) Li/Na/K/Cu 1
- (b) (i) Al^{3+} 1
(ii) Cl^{-} 1
(iii) $AlCl_3$ 1
- (c) (i) covalent 1
(ii) CCl_4 1
(iii) $\begin{array}{c} \times \times \\ \times \times \\ H \times N \bullet \times H \\ \times \bullet \\ \times \bullet \\ H \end{array}$ (1 for bond pairs, 1 for lone pair) 2
- TOTAL 9**

QUESTIONSHEET 2

- (a) (i) CO_2 1
(ii) thermal decomposition 1
- (b) (i) 100 1
(ii) M_r of CaO = 56 1
56 t CaO produced from 100 t calcium carbonate 1
280 t CaO produced from 500 t calcium carbonate 1
- TOTAL 6**

QUESTIONSHEET 3

- (a) 2 and 2 1
- (b) mass of magnesium = $44.9 - 40.1 = 4.8$ g 1
mass of magnesium oxide = $48.1 - 40.1 = 8.0$ g 1
so, mass of oxygen = $8.0 - 4.8 = 3.2$ g 1
moles of oxygen = $3.2/16 = 0.2$ 1
moles of magnesium = $4.8/24 = 0.2$ 1
ratio Mg:O = 1:1 therefore MgO 1
- TOTAL 7**

QUESTIONSHEET 4

- (a) (i) to condense water 1
- (ii) find boiling point/boiling point is 100°C/
find freezing point/freezing point is 0°C/
blue cobalt chloride paper goes pink 1

Note: Cobalt chloride paper test only shows the presence of water, not that the substance is water.
It could be dilute acid, salt solution etc.

- (b) (i) $2.5 - 1.6 = 0.9 \text{ g}$ 1
- (ii) $0.9 / 2.5$ 1
 $= 36\%$ 1
- (c) (i) dehydration 1
- (ii) $\text{CuSO}_4 + 5\text{H}_2\text{O} \rightarrow \text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ 1
- (iii) 1

TOTAL 8**QUESTIONSHEET 5**

- (a) (i) $23 + 14 + (3 \times 16) = 85$ 1
- (ii) $14 + (4 \times 1) + 14 + (3 \times 16) = 80$ 1
- (b) (i) $14/85 \times 100$ 1
 $= 16.5\%$ 1
- (ii) $28/80 \times 100$ 1
 $= 35\%$ 1
- (c) ammonium nitrate 1
- (d) Two from:
alkaline/gas/poisonous/very soluble/smelly 2

TOTAL 9

QUESTIONSHEET 6

- (a) (i) $3.5/14 = 0.25$ $4/16 = 0.25$ 1
NO 1
- (ii) $50/16 = 3.1$ $50/32 = 1.5625$ 1
SO₂ 1
- (iii) $39/39 = 1$ $1/1 = 1$ $12/12 = 1$ $48/16 = 3$ 1
KHCO₃ 1
- (iv) mass of oxygen = $16.0 - 11.2 = 4.8$ 1
 $4.8/16 = 0.3$ $11.2/56 = 0.2$ 1
Fe₂O₃ 1
- (b) (i) $4.04/1 = 4.04$ $24.24/12 = 2.02$ $71.72/35.5 = 2.02$ 1
ratio of H:C:Cl = 2:1:1 1
CH₂Cl 1
- (ii) relative mass of CH₂Cl = 49.5 1
 $99/49.5 = 2$ therefore C₂H₄Cl₂ 1

TOTAL 14**QUESTIONSHEET 7**

- (a) copper(II) oxide 1
- (b) (i) copper(II) chloride 1
(ii) copper and chlorine 2
(iii) bleaches 1
moist indicator paper 1
- (c) (i) copper 1
(ii) water 1
(iii) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$ 1
(iv) reducing agent 1

TOTAL 10

QUESTIONSHEET 8

- (a) (i) to allow you to find mass of substances in it 1
- (ii) $125.9 - 117.8 = 8.1$ g 1
- (iii) $124.7 - 117.8 = 6.9$ g 1
- (iv) $8.1 - 6.9 = 1.2$ g 1
- (v) $1.2/8.1 \times 100$ 1
= 14.8% 1
- (b) heat the crucible again 1
cool and reweigh 1
repeat until weight is constant 1
- (c) (i) 208 1
- (ii) 18 1
- (d) moles of $\text{BaCl}_2 = 6.9/208 = 0.0332$ 1
moles of water = $1.2/18 = 0.0667$ 1
ratio of 1:2 therefore $x = 2$ 1

TOTAL 14**QUESTIONSHEET 9**

- (a) precipitation 1
- (b) reduction 1
- (c) endothermic 1
- (d) reversible 1
- (e) decomposition 1
- (f) oxidation 1
- (g) displacement 1
- (h) combustion 1

Note: In a question of this type it is not necessary to use all the available terms.
Sometimes, a term will be required more than once.

TOTAL 8

QUESTIONSHEET 10

- | | | |
|-----|--|--------|
| (a) | energy/ heat transferred to surroundings | 1 |
| (b) | Ca(OH) ₂ | 1 |
| (c) | neutralise acidity in lakes/soil/swimming pools | 1 |
| (d) | bubble carbon dioxide through it | 1 |
| (e) | heating it strongly | 1 |
| (f) | compounds can be formed from each other
any substances added are given off at a later stage | 1
1 |

TOTAL 7**QUESTIONSHEET 11**

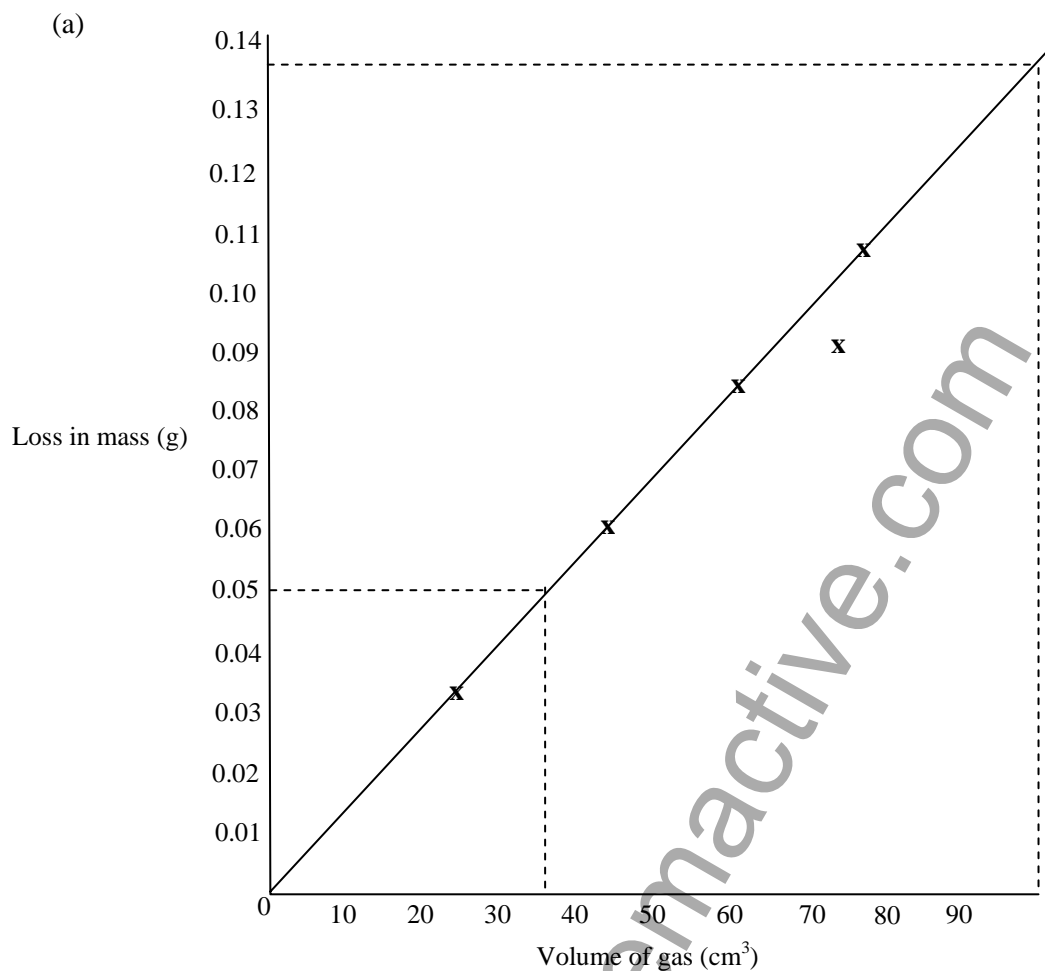
- | | | |
|-----|---|---|
| (a) | displacement | 1 |
| (b) | c, e, f | 3 |
| (c) | chlorine + potassium bromide → bromine + potassium chloride | 1 |
| (d) | Cl ₂ + 2KBr → 2KCl + Br ₂ | 2 |
| (e) | chlorine most reactive, then bromine, last iodine | 1 |
| (f) | fluorine displaces chlorine | 1 |
| (g) | no reaction | 1 |

TOTAL 10**QUESTIONSHEET 12**

- | | | |
|-----|--|--------|
| (a) | all are soluble | 1 |
| (b) | all are soluble | 1 |
| (c) | all except nitrate
are insoluble | 1
1 |
| (d) | (i) <u>lead carbonate</u> + sodium nitrate | 2 |
| | (ii) no precipitate formed/ no reaction | 1 |
| | (iii) <u>barium sulphate</u> + sodium chloride | 2 |
| (e) | barium sulphate is very insoluble
not absorbed into bloodstream | 1
1 |

TOTAL 11

QUESTIONSHEET 13



labelled axes	1
sensible scales	1
accurate plotting	1
line of best fit	1

- (b) student 4 1
- (c) (i) 38 cm³ (+/- 1 cm³) 1
- (ii) 0.02 g (+/- 0.005 g) 1
- (d) (i) find the density of the gas / mass/volume 1
compare to data book 1
- (ii) glowing splint 1
relights 1

Note: Always include the result of a chemical test. It is not sufficient to say, for example, "Use the glowing splint test".

TOTAL 11

QUESTIONSHEET 14

- (a) (i) A and D 1
- (ii) rusting requires water/moisture 1
and oxygen/air 1
- (b) tube D 1
salt/ions in salt accelerates rusting 1
- (c) zinc/magnesium attached to hull/pier 1
zinc/magnesium more reactive than iron 1
corrodes in preference to iron 1
- (d) (i) alloyed with another metal/electroplated 1
- (ii) coated in paint/plastic/electroplated 1

TOTAL 10**QUESTIONSHEET 15**

- (a) Two from:
alloys may resist corrosion
alloys may look more attractive
alloys have lower melting points 2
- (b) (i) iron/steel 1
- (ii) galvanising 1
- (c) (i) sulphur dioxide 1
- (ii) Zn^{2+} 1
- (d) neutralisation 1
- (e) (i) carbon 1
- (ii) $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$ 1
- (iii) reduction 1

TOTAL 10

QUESTIONSHEET 16

(a)	(i)	sodium hydrogencarbonate	1
	(ii)	acid	1
	(iii)	sodium carbonate	1
(b)		the acid and carbonate react together and fizz/produce carbon dioxide	1 1
(c)	(i)	raising agent because it decomposes when heated to give carbon dioxide gas	1 1
	(ii)	does not produce carbon dioxide when heated	1
			TOTAL 8

QUESTIONSHEET 17

(a)	(i)	calcium oxide	1
	(ii)	calcium carbonate	1
(b)		endothermic	1
(c)		limestone glowed brightly crumbled	1 1
(d)		process is continuous/less energy loss/ time-saving	1
(e)	(i)	Two from: jobs created money brought into area extension better than starting new quarry	2
	(ii)	Two from: loss of animal habitats eyesore dust noise extra lorries on roads	2
			TOTAL 10

QUESTIONSHEET 18

(a)	(i)	delivery tube on end of test tube	1
		delivery tube through cork	1
		end of delivery tube in limewater	1
	(ii)	limewater	1
		goes cloudy/milky	1
(b)	(i)	copper produces a green flame	1
	(ii)	dipped in acid	1
	(iii)	calcium	1
(c)		calcium carbonate	1
			TOTAL 9

QUESTIONSHEET 19

(a)		D	1
(b)	(i)	A	1
	(ii)	hydrogen	1
(c)		C	1
(d)	(i)	D	1
	(ii)	irritant/harmful	1
(e)		hydrogen burns to make water	1
		wasserstoff = water maker	1
			TOTAL 8

QUESTIONSHEET 20

(a)	(i)	$C + O_2 \rightarrow CO_2$	1
	(ii)	poisonous	1
(b)	(i)	oxygen is removed	1
	(ii)	carbon	1
(c)		harder	1
		lighter in colour	1
		rougher texture	1
			TOTAL 7