

Identification of Common Gases

Mark Scheme

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.8 Chemical Analysis
Sub-Topic	Identification of Common Gases
Difficulty Level	Gold Level
Booklet	Mark Scheme

Time Allowed: 17 minutes

Score: /17

Percentage: /100

Grade Boundaries:

M1. (a) limewater **or** calcium hydroxide solution

1

(reacts with carbon dioxide and) turns cloudy / milky

linked to first point

if no other mark awarded 'puts out lighted splint' gains 1 mark

1

(b) (i) any **two** from:

- same volume / amount of the acids
- concentration of the acids
- temperature
- same surface area / size / mass / amount of calcium carbonate
- same measuring equipment

2

(ii) any **three** from:

- (after about 4 minutes) the sulfuric acid stops reacting **or** nitric acid continues to react
accept more CO₂ with nitric acid at any time after 4 minutes
- (initially) the reaction with sulfuric acid is faster
- (the reaction stops) because calcium sulfate is a solid
allow sulfuric acid produces a solid
- (the reaction continues) because calcium nitrate is soluble / in solution / aqueous
allow nitric acid produces an (aqueous) solution
- because the calcium sulfate prevents the sulfuric acid reacting with the calcium carbonate
- (the rate is faster) because sulfuric acid contains two hydrogens

3

- M2.**
- (a) (i) test: limewater
accept calcium hydroxide solution 1
- result: 'goes' cloudy
accept white or milky
do not accept misty or chalky test must be correct before result mark can be considered 1
- (ii) $2 \text{NaHCO}_3 + \text{H}_2\text{SO}_4 \rightarrow$
 $\text{Na}_2\text{SO}_4 + (2) \text{H}_2\text{O} + (2) \text{CO}_2$ 1
- correctly balanced 1
- (b) (i) $\text{H}^+ + \text{OH}^-$ 1
- $\rightarrow \text{H}_2\text{O}$
- deduct **one** mark if incorrectly balanced
accept H_3O^+ instead of H^+ then $2\text{H}_2\text{O}$ needed for balance 1
- (ii) pH increases
accept numerical indication 1
- (c) addition of sulphuric acid 1
- correct use of an indicator
accept idea of forming a neutral solution 1

crystallisation (of neutral solution)

accept description using evaporation

1

[10]