Metals

Mark Scheme 1

Level	IGCSE
Subject	Chemistry
Exam Board	CIE
Topic	Metals
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Mark Scheme 1

Time Allowed: **47 minutes**

Score: **/39**

Percentage: **/100**

1 weigh mixture (1)

add excess (1) sulfuric acid (1)

heat / stir (1)

filter (1) wash (1) dry (1) the carbon / residue

reweigh(1) calculate percentage (1) max 6 [6]

will not work = 0
ignore: details of evaporation of copper sulfate solution
note: must have at least one weighing for 6 marks

2 **(a (i)** (gas) syringe (1) [1]

(ii) arrow indication under copper (1) [1]

(b) spatula (1) [1]

(c) black (1) [1]

(d) to return to room/initial temperature (1)
correct volume of gas (1) [2]

3 **(a** Table of results for Experiment 1
temperature boxes completed correctly (3)
20, [3]

(b) Table of results for Experiment 2
temperature boxes completed correctly (3)
20, [3]

(c) all points correctly plotted (3) -1 for each incorrect
best fit smooth line graphs (1)
labels (1) [5]

(d) value from graph ≈28°C ± half small square (1) unit (1) shown clearly (1) [3]

(e) exothermic/redox/displacement (1) [1]

(f) **(i)** temperature rises greater/faster in Experiment 1 (1) **allow** converse [1]

(ii) zinc is more reactive (1) [1]

(g) temperature changes would be same/faster/owtte (1) metal in excess (1)/
temperature changes would be greater (1) lower volume (1) [2]

(h) solid would react slower/temperature rises would be slower (1)
smaller surface area (1) [2]

4 crush malachite (1) using pestle/mortar (1) add named acid (1)
solution formed (1) add magnesium/zinc/iron (1) displacement (1)
obtain copper/filter (1) max [6] [6]

or first two steps (2) add carbon/reactive metal/hydrogen (1) heat (1)
displace/redox (1) until goes pink (1) obtain copper (1)
or first four steps (4) electrolyse solution (1) copper deposited at cathode (1)
obtain copper (1) NB If malachite anode used allow max 3 even if it would not work.