Mark scheme

Reactivity of metals

Chemistry 0620 · Questions from Paper 1, Paper 2, Paper 4 and Paper 6

Total marks

42

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
1	1	1	1	1	1	8	6	8	14	**42**

Question 1 **[1]**

Answer A

Question 2 **[1]**

Answer B

Question 3 **[1]**

Answer C

Question 4 **[1]**

Answer A

Question 5 **[1]**

Answer D

Question 6 **[1]**

Answer A

STEM | Exam Builder

Question 7 [8]

7 **(a)** calcium carbonate → calcium oxide + carbon dioxide [1]
accept: correct symbol equation

$Ca(OH)_2 \rightarrow CaO + H_2O$ [1]

(b) **(i)** CuO **and** NO_2 **and** O_2; [1]
accept: names or correct formulae

(ii) $2NaNO_3 \rightarrow 2NaNO_2 + O_2$ [2]
accept: $NaNO_3 \rightarrow NaNO_2 + 1/2\ O_2$
not balanced = [1]

(c) Na / Ca; [1]

(d) Cu; Ag; [2]
accept: *ions* Cu^{2+} *and* Ag^{+}

[Total: 8]

Question 8 [6]

8	**Method 1: Monitoring the reaction of the metal with acid** 6 from: • named acid; • same or stated volume of (same concentration of) acid; • fair test idea, i.e. same surface area / size / mass / amount metal; • measure volume of gas / count bubbles / temperature change / observe complete reaction; • suitable reference to time; • conclusion / comparison, e.g. most effervescence = most reactive; **Method 2: Displacement reaction** 6 from: • react each metal; • with named acid; • to prepare salt solution of each; • react each metal with each solution of salt; • observe if displacement occurs; • conclusion / comparison;	**6**	**I:** use of heat unless this is identified as the output variable for the experiment

STEM | Exam Builder

Question 9 [8]

9 **(a)** metal A is magnesium [1]
cond most reactive or fastest reaction [1]

metal B is aluminium [1]
cond faster reaction after removal of oxide layer / it would give more hydrogen / aluminium more reactive than zinc [1]

metal C is zinc [1]
zinc least reactive [1]
NOTE MAX [5]
If you encounter different reasoning which is correct, please award the appropriate marks.

(b) for magnesium and zinc same <u>volume</u> of hydrogen [1]

because both have valency of 2 / 1 mole of metal gives 1 mole of hydrogen / 1 mole of metal reacts with 2 moles of acid [1]

bigger volume for aluminium because its valency is 3 / 1 mole of metal gives 1.5 moles of hydrogen / 1 mole of metal reacts with 3 moles of acid [1]

If you encounter different reasoning which is correct, please award the appropriate marks.

accept balanced equations
accept ionic charges as alternative to valency

Question 10 [14]

10(a)(i)	electron loss (from outer shell)	**1**
10(a)(ii)	potassium	**1**
10(a)(iii)	magnesium or potassium	**1**
10(a)(iv)	iron	**1**
10(b)	<table><tr><td></td><td>M1 Colourless</td></tr><tr><td>M2 Blue</td><td>M3 Colour given in M2</td></tr></table>	**3**
10(c)(i)	hydrogen	**1**
10(c)(ii)	strontium hydroxide	**1**
10(c)(iii)	**M1** magnesium **or** Mg **M2** magnesium oxide	**2**
10(d)	$Fe_3O_4 + 8HCl \rightarrow 2FeCl_3 + FeCl_2 + 4H_2O$ M1 $FeCl_2$ **or** $FeCl_3$ as product of equation M2 $FeCl_2$ **and** $FeCl_3$ **and** H_2O as only products of equation M3 Correct equation	**3**

STEM | Exam Builder