Mark scheme

Acids and bases

Chemistry 0620 · Questions from Paper 1, Paper 2, Paper 3 and Paper 4

Total marks

54

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
1	1	1	1	1	10	8	7	9	15	**54**

Question 1 [1]

Answer D

Question 2 [1]

Answer B

Question 3 [1]

Answer C

Question 4 [1]

Answer B

Question 5 [1]

Answer A

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Question 6 [10]

6(a)(i)	aqueous / dissolved in water	**1**
6(a)(ii)	filtration	**1**
6(b)(i)	acid: nitric (1) alkali: sodium hydroxide (1)	**2**
6(b)(ii)	$(H^+) + OH^- \rightarrow H_2O$ OH^- (1) H_2O (1)	**2**
6(b)(iii)	release of thermal energy	**1**
6(b)(iv)	the **energy** of the products is lower than the **energy** of the reactants **OR** the **energy** of the reactants is higher than the **energy** of the products	**1**
6(c)	*pH 2:* red / pink (1) *pH12:* yellow (1)	**2**

Question 7 [8]

7(a)(i)	SO_2	**1**
7(a)(ii)	Na_2O	**1**
7(a)(iii)	Cr_2O_3	**1**
7(a)(iv)	SiO_2	**1**
7(a)(v)	Al_2O_3 / Cr_2O_3	**1**
7(a)(vi)	CO	**1**
7(b)(i)	an amphoteric oxide will react with acids **AND** with bases	**1**
7(b)(ii)	a neutral oxide will **not** react with acids **or** with bases	**1**

Question 8 [7]

8(a)	*copper(II) carbonate* fizzes / bubbles / effervescence dissolves / disappears *copper(II) oxide* dissolves / disappears blue (solution formed)	**2** **2**
8(b)(i)	 $Cu(NO_3)_2$ $\underline{3}Cu$ **AND** $\underline{3}Cu(NO_3)_2$	**2**
8(b)(ii)	hydrogen (gas) is not produced (when copper reacts with nitric acid)	**1**

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Question 9 **[9]**

9 **(a)** Match the following pH values to the solutions given below.

1 3 7 10 13

The solutions all have the same concentration.

solution	**pH**
aqueous ammonia, weak base	10
dilute hydrochloric acid, a strong acid	1
aqueous sodium hydroxide, a strong base	13
aqueous sodium chloride, a salt	7
dilute ethanoic acid, a weak acid	3

[5]

(b) Hydrochloric acid strong acid **or** ethanoic acid weak acid [1]

OR: hydrochloric acid completely ionised **or** ethanoic acid partially ionised

hydrochloric acid greater concentration of/more H^+ ions (than ethanoic acid) [1]

(c) Rate of reaction with Ca, Mg, Zn, Fe [1]

Strong (hydrochloric) acid bubbles faster **or** more bubbles **or** dissolves faster [1]

OR: rate of reaction with (metal) carbonate [1]

strong (hydrochloric) acid faster **or** more bubbles **or** dissolves faster (only if carbonate insoluble) [1]

OR: electrical conductivity [1]

strong (hydrochloric) acid better conductor [1]

[Total: 9]

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Question 10 [15]

10(a)(i)	H^+	**1**
10(a)(ii)	**M1** complete (dissociation) **M2** partial (dissociation)	**2**
10(a)(iii)	ethanoic (acid)	**1**
10(a)(iv)	colourless	**1**
10(a)(v)	**M1** SO_4^{2-} **M2** CH_3COO^-	**2**
10(a)(vi)	**M1** hydrogen **M2** oxygen	**2**
10(a)(vii)	calcium ethanoate	**1**
10(b)(i)	proton acceptor	**1**
10(b)(ii)	insoluble	**1**
10(b)(iii)	aluminium oxide	**1**
10(b)(iv)	**M1** use of –18 or (9×-2) or ($3 \times 3 \times -2$) **M2** +5	**2**

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