Question 1

1(c)	methyl orange	1

Question 2

2(d)(i)	magnesium chloride (1) water (1)	2
2(d)(ii)	1st box from top ticked (magnesium carbonate)	1

Question 3

3(e)	sodium sulfate (1) carbon dioxide (1) water (1)	3
3(f)	colourless	1

Question 4

4(c)	magnesium ethanoate (1) hydrogen (1)	2

Question 5

5(c)(iii)	pH 10	1

Question 6

6(c)(i)	OH^-	1
6(c)(ii)	pH 13	1

Question 7

7(b)	calcium chloride (1) water (1)	2

Question 8

8(d)(i)	**M1** CaO is basic **M2** SiO_2 is acidic	2

Question 9

9(a)	proton acceptor	**1**
9(b)	a soluble base	**1**
9(c)	**M1** blue **M2** colourless	**2**
9(d)(i)	**M1** HNO_3 **M2** lowest pH	**2**
9(d)(ii)	universal indicator	**1**
9(e)	$(CH_3COOH) \rightleftharpoons CH_3COO^- + H^+$ **M1** H^+ **M2** CH_3COO^- **M3** $\rightleftharpoons$	**3**

9(f)	$H^+ + OH^- \rightarrow H_2O$	**1**
9(g)	**M1** $(0.0150 \times 20.0/1000 =) 0.0003(00) / 3.00 \times 10^{-4}$ (mol) **M2** $(M1 \times 2 = 3.00 \times 10^{-4} \times 2 =) 0.0006(00) / 6.00 \times 10^{-4}$ (mol) **M3** $(M2 \times 1000/25.0 = 6.00 \times 10^{-4} \times 1000 / 25.0 =) 0.0240$ (mol / dm^3) **M4** 63 (g / mol) **M5** $(M3 \times M4 = 0.0240 \times 63 =) 1.51(2)$ (g / dm^3)	**5**

Question 10

10(a)	metallic	**1**
10(b)(i)	lighted splint **and** (squeaky) pop	**1**
10(b)(ii)	14	**1**
10(b)(iii)	universal indicator	**1**

10(b)(iv)	$2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$ **M1** NaOH as product in equation (1) **M2** fully correct equation (1) **M3** state symbols (1)	**3**

Question 11

11(a)	B	**1**

Question 12

12(b)	ammonia	**1**

Question 13

13(c)(i)	proton donor	**1**
13(c)(ii)	partial dissociation	**1**
13(c)(iii)	**M1** 4×-2 or -8 (1) **M2** $P + (4 \times -2) = -3 \therefore P =$ **+5** (1)	**2**