Question 1

1(a)	CH_4	**1**
1(b)	Br_2	**1**
1(c)	Cl^-	**1**
1(d)	Cr^{3+}	**1**
1(e)	CO_2	**1**
1(f)	O_2	**1**

Question 2

2(a)(i)	circle around the COOH group	**1**
2(a)(ii)	$C_3H_6O_3$	**1**

Question 3

3(e)	6 (CoO)	**1**

Question 4

4(c)(i)	2 (H_2S) (1) 3 (O_2) (1)	**2**

Question 5

5(a)(iv)	$C_4H_8O_2$	**1**

Question 6

6(c)(i)	2 (P) (1) 5 (Cl_2) (1)	**2**

Question 7

7(b)	3 (Zn) (1) 2 (P) (1)	**2**

Question 8

8(f)	$H^+ + OH^- \rightarrow H_2O$	**1**

Question 9

9(a)(i)	$4FeS_2 + 11O_2 \rightarrow 2Fe_2O_3 + 8SO_2$	**1**

9(d)(i)	lead(II) nitrate	**1**

9(d)(ii)	$Pb^{2+}(aq) + SO_4^{2-}(aq) \rightarrow PbSO_4(s)$ **M1** $PbSO_4$ on the right(1) **M2 only** Pb^{2+} and SO_4^{2-} on the left(1) **M3**(aq) + (aq) → (s)(1)	**3**

Question 10

10(a)(i)	**M1** Ag column all ✗ (1) **M2** ✗ in Pb **AND** 2 ✓ in Zn (1) **M3** Zn, Mn, Pb Ag (1)	**3**
10(a)(ii)	(all) nitrates are soluble **OR** lead sulfate is insoluble	**1**

10(a)(iii)	$Zn + 2AgNO_3 \rightarrow Zn(NO_3)_2 + 2Ag$ **M1** $Zn(NO_3)_2$ on the right hand side (1) **M2** correct equation (1)	**2**

Question 11

11(c)	formulae	**1**
	balance, $4X + 3O_2 \rightarrow 2X_2O_3$	**1**

Question 12

12(b)(i)	2 bonding pairs as **one dot and cross** each (1) 2 lone pairs on S (and no additional electrons on Hs) to complete the outer shell on S and both Hs (1)	**2**
12(b)(ii)	$\mathbf{2}H_2S + SO_2 \rightarrow \mathbf{3}S + \mathbf{2}H_2O$	**1**

Question 13

13(h)	C 48.65 / 12 H 8.11 / 1 O 43.24 / 16 **OR** 4.05:8.11:2.70 (1) fractions shown dividing all by smallest **OR** 1.5:3:1 **OR** 3:6:2 (1) $C_3H_6O_2$ (1)	**3**
13(i)	$C_4H_8O_2$	**1**