IGCSE Chemistry: **w25 21**

Question 18 (Answer: **C**)

- In MnO_4^- the four oxygens are -2 each, so manganese is $+7$; in Mn^{2+} it is $+2$.
- Iodide is -1 and iodine as I_2 is 0.
- So manganese falls from $+7$ to $+2$ and iodine rises from -1 to 0.

IGCSE Chemistry: **w25 22**

Question 19 (Answer: **C**)

- Let the oxidation number of chromium be x.
- The seven oxygens are -2 each, so $2x + 7(-2) = -2$.
- $2x = 12$, so $x = +6$.

IGCSE Chemistry: **w25 23**

Question 18 (Answer: **A**)

- A more concentrated acid has more particles in the same volume.
- So collisions happen more often and the rate rises.
- But the particles' *energy* is unchanged, so the fraction able to react is exactly the same.

Question 22 (Answer: **B**)

- In HNO_3 the nitrogen is $+5$; in NO_2 it is $+4$.
- A fall in oxidation number is reduction.
- Copper goes from 0 to $+2$, so the copper is oxidised, not reduced.

IGCSE Chemistry: **w25 42**

2(a)(i)	hematite
2(a)(ii)	burning of carbon (coke)

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2(a)(iii)	carbon monoxide
2(a)(iv)	$3CO + Fe_2O_3 \rightarrow 2Fe + 3CO_2$ **M1** species **M2** correct equation
2(a)(v)	**M1** $CaCO_3 \rightarrow CaO + CO_2$ **M2** $CaO + SiO_2 \rightarrow CaSiO_3$
2(b)	**M1** atoms of the same element that have the same number of protons **M2** but different numbers of neutrons
2(c)(i)	p = 26 and 26 n = 28 and 32 e = 24 and 23
2(c)(ii)	**M1** $NaOH(aq)$ OR $NH_3(aq)$ **M2** green ppt. (insoluble in excess, ppt. turns brown near surface on standing)
2(d)(i)	a substance that oxidises another substance and is itself reduced **M1** 'a substance' oxidises another substance **M2** is itself reduced
2(d)(ii)	loss of (one) electron
2(d)(iii)	acidified
2(e)	iodine

IGCSE Chemistry: **s25 22**

Question 17 (Answer: **C**)

- A reducing agent is itself oxidised, so its oxidation number must increase.
- In equation 2 iron goes from 0 to $+2$, and in equation 3 from $+2$ to $+3$ – both oxidised.
- In equation 1 the underlined species is reduced, and equation 4 is a neutralisation with no change at all.

IGCSE Chemistry: **s25 23**

Question 18 (Answer: **D**)

- In Fe_2O_3 the three oxygens are -2 each, so each iron must be $+3$.
- In the product the iron is an uncombined element, so its oxidation number is 0.
- So the change is from $+3$ to 0 – the iron has been reduced.

IGCSE Chemistry: **m25 22**

Question 21 (Answer: **D**)

- Reduction is loss of oxygen, or gain of electrons.
- Mercury(II) oxide loses its oxygen to become mercury metal.
- The mercury also goes from $+2$ to 0, gaining electrons – both definitions agree.