IGCSE Chemistry: **w25 23**

Question 26 (Answer: **A**)

- Transition elements have strong metallic bonding, giving high melting points.
- Their atoms are heavy and closely packed, giving high densities.
- Group I metals are the opposite – low melting point and low density.

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Question 23 (Answer: **A**)

- Both iron and lithium are metals, so both conduct electricity well and both are malleable.
- Lithium's melting point is low (about 180 °C), so statement 2 fails.
- Only the transition metal iron shows variable oxidation numbers, so statement 4 fails.

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Question 24 (Answer: **D**)

- Transition elements have high melting points, high densities and coloured compounds.
- A melting point of 1907 °C with a density of 7.2 g/cm^3 fits a transition metal.
- The green oxide clinches it – Group I and Group II oxides are white.

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<table>
<tr><td>5(a)</td><td>
<table>
<tr><td></td><td>^{55}Mn</td><td>^{42}Ca^{2+}</td></tr>
<tr><td>protons</td><td>25</td><td>20</td></tr>
<tr><td>neutrons</td><td>30</td><td>22</td></tr>
<tr><td>electrons</td><td>25</td><td>18</td></tr>
</table>
Each row ✓
</td></tr>
<tr><td>5(b)(i)</td><td>(Mn is a) transition element</td></tr>
<tr><td>5(b)(ii)</td><td>variable oxidation state</td></tr>
<tr><td>5(b)(iii)</td><td>MnO</td></tr>
<tr><td>5(c)(i)</td><td>a substance that reduces another substance and is itself oxidised
M1 'a substance' reduces another substance

M2 is itself oxidised</td></tr>
<tr><td>5(c)(ii)</td><td>$3Mn_3O_4 + 8Al \rightarrow 4Al_2O_3 + 9Mn$
M1 Al_2O_3
M2 correct equation</td></tr>
<tr><td>5(d)(i)</td><td>**M1** $50 \times 0.200 \div 1000 = 0.01(00)$
M2 $0.01 \div 4 = 0.0025(0)$ / $2.5(0) \times 10^{-3}$
M3 $= 0.0025 \times 24000 = 60(.0)$</td></tr>
<tr><td>5(d)(ii)</td><td>(damp) litmus (paper)
and
is bleached / goes white</td></tr>
<tr><td>5(d)(iii)</td><td>**M1** kinetic energy of particles decreases

M2 frequency of collisions between particles decreases

M3 lower percentage / proportion / fraction of collisions / particles have energy greater than / equal to activation energy
OR
Fewer **of the** collisions / particles have energy greater than / equal to activation energy</td></tr>
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