

Question 7 (Answer: **A**)

- In a metal the outer electrons leave the atoms and become delocalised.
- Those electrons are free to move right through the lattice.
- Moving charge is an electric current, which is why magnesium conducts even as a solid.

Question 9 (Answer: **C**)

- Cobalt is a metal, so it is built from positive ions with delocalised electrons.
- That bonding extends throughout the sample, so the structure is giant, not simple.
- Giant metallic – there are no ionic or molecular units.

3(a)(i)	M1 positive ions / cations(1) M2 sea of electrons / mobile electrons / delocalised electrons(1) M3 attraction between positive ions and electrons(1)
3(a)(ii)	electrons move / electrons mobile / electrons flow
3(b)(i)	harder or stronger
3(b)(ii)	zinc
3(c)(i)	Any two from:- • solid disappears / solid dissolves • fizzing / bubbling / effervescence • blue solution
3(c)(ii)	all the sulfuric acid had reacted
3(c)(iii)	copper(II) carbonate
3(c)(iv)	copper(II) oxide / copper(II) hydroxide
3(c)(v)	saturated (solution)
3(c)(vi)	M1 more particles per unit volume M2 more collisions per unit time / increased collision frequency
3(c)(vii)	hydrated

3(a)(i)	metallic (bonding)
3(a)(ii)	M1 positive ions M2 electrons
3(a)(iii)	electrons
3(b)(i)	a mixture of a metal with other elements
3(b)(ii)	copper
3(c)(i)	M1 solid stops dissolving / disappearing M2 no more bubbles / fizzing / effervescence on addition of solid
3(c)(ii)	aqueous zinc sulfate
3(c)(iii)	zinc oxide OR zinc hydroxide
3(c)(iv)	M1 (a solution containing the) maximum concentration of a solute dissolved in the solvent M2 at a specified temperature
3(c)(v)	M1 (large pieces have) smaller surface area M2 frequency of collisions between (zinc carbonate and acid) particles decreases
3(c)(vi)	(crystals that are) chemically combined with water

Question 8 (Answer: **D**)

- A metal atom loses its outer electrons, leaving positive ions – cations.
- Those electrons are free to move through the whole lattice, so they are delocalised.
- There are no anions anywhere in a metal.