# GCSE Chemistry A (Gateway Science)

**J248/04** Chemistry A C4-C6 and C7 (Higher Tier)

## Question Set 27

**1** Aluminium is extracted from its ore using electrolysis.

Copper is extracted from its ore by heating with carbon.

**(a)** Explain why different methods are used to extract aluminium and copper. **[2]**

**(b)** Molten aluminium oxide contains $Al^{3+}$ and $O^{2-}$ ions.

The electrolysis of molten aluminium oxide makes aluminium and oxygen.

**(i)** Write the **balanced** half-equation for the reaction that happens at the cathode.

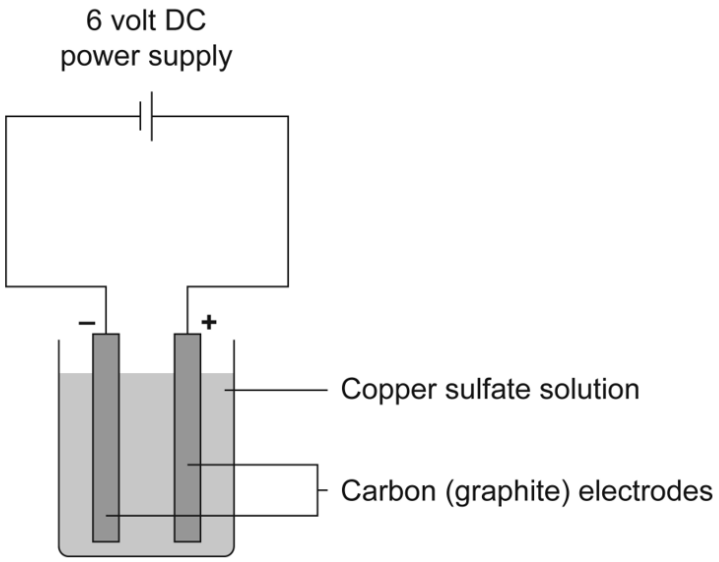
Use the symbol $e^-$ to represent an electron. **[1]**

**(ii)** Solid aluminium oxide **cannot** be electrolysed.

Explain why. **[1]**

**(c)** Copper is also made by electrolysis of copper sulfate solution.

Look at the diagram of the apparatus used in this electrolysis.




Describe what you would **see** at each electrode.

At the anode: .....

At the cathode: ……

**[2]**

## Total Marks for Question Set 27: 6

# The Periodic Table of the Elements

| (1) | (2) | | | | | | | | | | | (3) | (4) | (5) | (6) | (7) | (0) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | 18 |
| 1 **H** hydrogen 1.0 | 2 | | | | | | | | | | | 13 | 14 | 15 | 16 | 17 | 2 **He** helium 4.0 |
| 3 **Li** lithium 6.9 | 4 **Be** beryllium 9.0 | | | | | | | | | | | 5 **B** boron 10.8 | 6 **C** carbon 12.0 | 7 **N** nitrogen 14.0 | 8 **O** oxygen 16.0 | 9 **F** fluorine 19.0 | 10 **Ne** neon 20.2 |
| 11 **Na** sodium 23.0 | 12 **Mg** magnesium 24.3 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 **Al** aluminium 27.0 | 14 **Si** silicon 28.1 | 15 **P** phosphorus 31.0 | 16 **S** sulfur 32.1 | 17 **Cl** chlorine 35.5 | 18 **Ar** argon 39.9 |
| 19 **K** potassium 39.1 | 20 **Ca** calcium 40.1 | 21 **Sc** scandium 45.0 | 22 **Ti** titanium 47.9 | 23 **V** vanadium 50.9 | 24 **Cr** chromium 52.0 | 25 **Mn** manganese 54.9 | 26 **Fe** iron 55.8 | 27 **Co** cobalt 58.9 | 28 **Ni** nickel 58.7 | 29 **Cu** copper 63.5 | 30 **Zn** zinc 65.4 | 31 **Ga** gallium 69.7 | 32 **Ge** germanium 72.6 | 33 **As** arsenic 74.9 | 34 **Se** selenium 79.0 | 35 **Br** bromine 79.9 | 36 **Kr** krypton 83.8 |
| 37 **Rb** rubidium 85.5 | 38 **Sr** strontium 87.6 | 39 **Y** yttrium 88.9 | 40 **Zr** zirconium 91.2 | 41 **Nb** niobium 92.9 | 42 **Mo** molybdenum 95.9 | 43 **Tc** technetium | 44 **Ru** ruthenium 101.1 | 45 **Rh** rhodium 102.9 | 46 **Pd** palladium 106.4 | 47 **Ag** silver 107.9 | 48 **Cd** cadmium 112.4 | 49 **In** indium 114.8 | 50 **Sn** tin 118.7 | 51 **Sb** antimony 121.8 | 52 **Te** tellurium 127.6 | 53 **I** iodine 126.9 | 54 **Xe** xenon 131.3 |
| 55 **Cs** caesium 132.9 | 56 **Ba** barium 137.3 | ● 57–71 lanthanoids | 72 **Hf** hafnium 178.5 | 73 **Ta** tantalum 180.9 | 74 **W** tungsten 183.8 | 75 **Re** rhenium 186.2 | 76 **Os** osmium 190.2 | 77 **Ir** iridium 192.2 | 78 **Pt** platinum 195.1 | 79 **Au** gold 197.0 | 80 **Hg** mercury 200.6 | 81 **Tl** thallium 204.4 | 82 **Pb** lead 207.2 | 83 **Bi** bismuth 209.0 | 84 **Po** polonium | 85 **At** astatine | 86 **Rn** radon |
| 87 **Fr** francium | 88 **Ra** radium | ● 89–103 actinoids | 104 **Rf** rutherfordium | 105 **Db** dubnium | 106 **Sg** seaborgium | 107 **Bh** bohrium | 108 **Hs** hassium | 109 **Mt** meitnerium | 110 **Ds** darmstadtium | 111 **Rg** roentgenium | 112 **Cn** copernicium | | 114 **Fl** flerovium | | 116 **Lv** livermorium | | |

**Key**
atomic number
**Symbol**
name
relative atomic mass