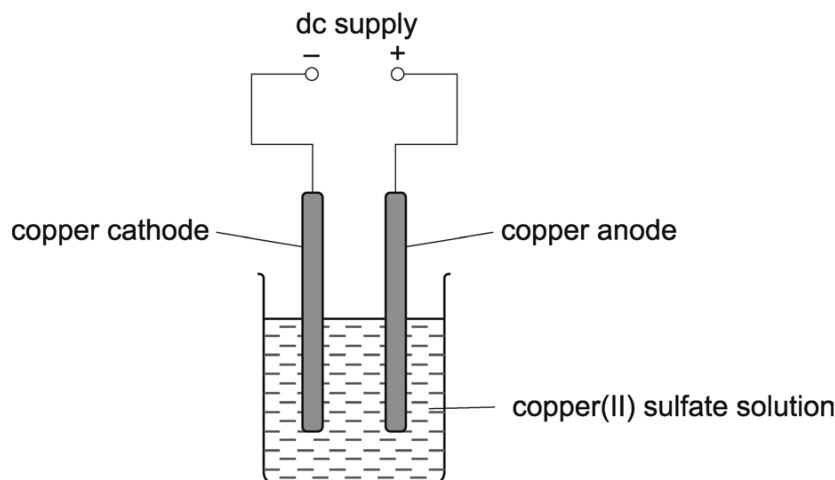


**GCSE Chemistry A (Gateway Science)**  
**J248/03 C1-C3 and C7 Higher (Higher Tier)**

**Question Set 29**

- 1 A student electrolyses copper sulfate using copper electrodes.

Look at the diagram. It shows the apparatus she uses.



She investigates the change in mass at each electrode before and after the electrolysis.

Look at her method.

1. Using a balance, measure the mass of the copper cathode and copper anode.
2. Set up the apparatus and run the electrolysis for 30 seconds.
3. Remove the copper cathode and the copper anode and immediately place them on the balance and measure their masses again.

- (a) What improvements could you make to the student's experiment?

Explain your answers.

[4]

- (b) The student finds that:

- the cathode gains mass
- the anode loses mass.

Explain these observations in terms of the reactions at each electrode.

[2]

Copper is deposited at the cathode whilst copper anode dissolves at the anode (forming  $\text{Cu}^{2+}$ )

**Total Marks for Question Set 29: 6**

1. a) - Electrolysis needs to run for longer than 30s otherwise insufficient change at electrodes  
- After electrolysis, anode and cathode need to be washed and then dried before measuring the mass.

# The Periodic Table of the Elements

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

Key  
atomic number  
Symbol  
name  
relative atomic mass

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