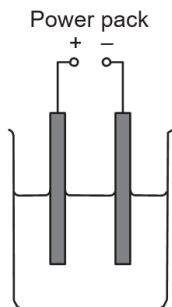


**GCSE Chemistry A (Gateway Science)**  
**J248/03 C1-C3 and C7 Higher (Higher Tier)**

**Question Set 19**

1 A student is investigating the electrolysis of copper sulfate solution.



He does two experiments.

Experiment 1 uses platinum electrodes. Experiment 2 uses copper electrodes.

(a) Complete the table to show the products at each electrode.

Experiment	What happens at cathode (-)	What happens at anode (+)
1	copper deposited	Oxygen made
2	Copper deposited	copper anode dissolves

[2]

(b) Copper electrodes are **non-inert** electrodes.

What is meant by non-inert electrodes?

Non-inert electrodes can react with the solution thus changed during electrolysis

[1]

(c) Look at the results for experiment 2 using **copper** electrodes.

At the cathode copper ions,  $\text{Cu}^{2+}$  gain electrons to make copper atoms.

Write the **half equation** for this reaction.

Use  $e^-$  to represent an electron.

[2]



(d) The student also electrolyses sodium chloride solution using platinum (inert) electrodes.

At the cathode, hydrogen gas is made rather than sodium metal.

Explain why.

Because hydrogen is less reactive than sodium, it is discharged before sodium.

[2]

(hydrogen gains electron more easily than sodium)

**Total Marks for Question Set 19: 7**

# The Periodic Table of the Elements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
		Key															
		atomic number															
		Symbol															
		name															
		relative atomic mass															
1	2																
1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
H hydrogen 1.0	Li lithium 6.9	Be beryllium 9.0	B boron 10.8	C carbon 12.0	N nitrogen 14.0	O oxygen 16.0	F fluorine 19.0	Ne neon 20.2	Na sodium 23.0	Mg magnesium 24.3	Al aluminium 27.0	Si silicon 28.1	P phosphorus 31.0	S sulfur 32.1	Cl chlorine 35.5	Ar argon 39.9	
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
K potassium 39.1	Ca calcium 40.1	Sc scandium 45.0	Ti titanium 47.9	V vanadium 50.9	Cr chromium 52.0	Mn manganese 54.9	Fe iron 55.8	Co cobalt 58.9	Ni nickel 58.7	Cu copper 63.5	Zn zinc 65.4	Ga gallium 69.7	Ge germanium 72.6	As arsenic 74.9	Se selenium 79.0	Br bromine 79.9	Kr krypton 83.8
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb rubidium 85.5	Sr strontium 87.6	Y yttrium 88.9	Zr zirconium 91.2	Nb niobium 92.9	Mo molybdenum 95.9	Tc technetium	Ru ruthenium 101.1	Rh rhodium 102.9	Pd palladium 106.4	Ag silver 107.9	Cd cadmium 112.4	In indium 114.8	Sn tin 118.7	Sb antimony 121.8	Te tellurium 127.6	I iodine 126.9	Xe xenon 131.3
55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Cs caesium 132.9	Ba barium 137.3	lanthanoids	Hf hafnium 178.5	Ta tantalum 180.9	W tungsten 183.8	Re rhenium 186.2	Os osmium 190.2	Ir iridium 192.2	Pt platinum 195.1	Au gold 197.0	Hg mercury 200.6	Tl thallium 204.4	Pb lead 207.2	Bi bismuth 209.0	Po polonium	At astatine	Rn radon
87	88	89-103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Fr francium	Ra radium	actinoids	Rf rutherfordium	Db dubnium	Sg seaborgium	Bh bohrium	Hs hassium	Mt meitnerium	Ds darmstadtium	Rg roentgenium	Cn copernicium	Nh nihonium	Fl flerovium	Lv livermorium	Ts tennessine	Og oganeson	

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