GCSE Chemistry A (Gateway Science)

J248/03 C1-C3 and C7 Higher (Higher Tier)

Question Set 7

1 Metal elements and non-metal elements have different physical properties.

The table shows the physical properties of some elements.

Element	Melting point (°C)	Density (g/cm^3)	Electrical conductivity	Thermal conductivity	Cost
A	high	high	good	good	high
B	low	low	good	poor	high
C	high	low	good	good	low
D	high	high	poor	poor	low

(a) **(i)** Which element, **A**, **B**, **C** or **D**, would be best to use for cables in overhead pylons to transfer electricity?

Tick (✓) **one** box.

A ☐

B ☐

C ☑

D ☐

Explain your answer. Because C is a good electrical conductor and it has high melting point meaning it won't melt when it heats up. Moreover, it is light. **[2]**

(ii) What is meant by **physical** property? **[1]**

Any property that does not involve chemical change. e.g. colour, density

(b) Element **C** burns in oxygen to make white clouds of its oxide.

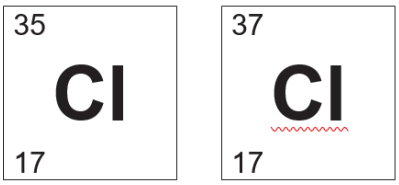
Describe how you could test the oxide to find out if the element is a metal. **[3]**

If it's a metal oxide, it would be basic oxides thus add oxide powder into water and check whether base is formed by using universal indicator (colour changes from green to blue/purple) or pH meter (pH rises from 7 to e.g. 13/14)

(c) **(i)** Chlorine is a non-metal.

Chlorine has two common **isotopes**.

Look at the information about the common isotopes of chlorine.



Complete the table to show the atomic structure for each isotope of chlorine.

Isotope	Number of protons	Number of neutrons	Number of electrons
Chlorine-35	17	18	17
Chlorine-37	17	20	17

[2]

(ii) Chlorine gas, Cl_2, reacts with barium, Ba.

Barium chloride, $BaCl_2$, is made.

Write a **balanced half** equation for **chlorine** in this reaction. **[1]**

$Cl_2 + 2e^- \longrightarrow 2Cl^-$

(iii) Barium chloride solution reacts with sodium sulfate solution, Na_2SO_4.

A white precipitate of barium sulfate, $BaSO_4$, is made.

Write a **balanced ionic** equation to show the formation of barium sulfate.

Include state symbols. **[2]**

$BaCl_2 + Na_2SO_4 \longrightarrow BaSO_4 + 2NaCl$

Total Marks for Question Set 7: 11

$Ba^{2+}_{(aq)} + 2Cl^-_{(aq)} + 2Na^+_{(aq)} + SO_4^-_{(aq)} \longrightarrow BaSO_4{}_{(s)} + 2Na^+_{(aq)} + 2Cl^-_{(aq)}$

$Ba^{2+}(aq) + SO_4^-(aq) \longrightarrow BaSO_4(s)$

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