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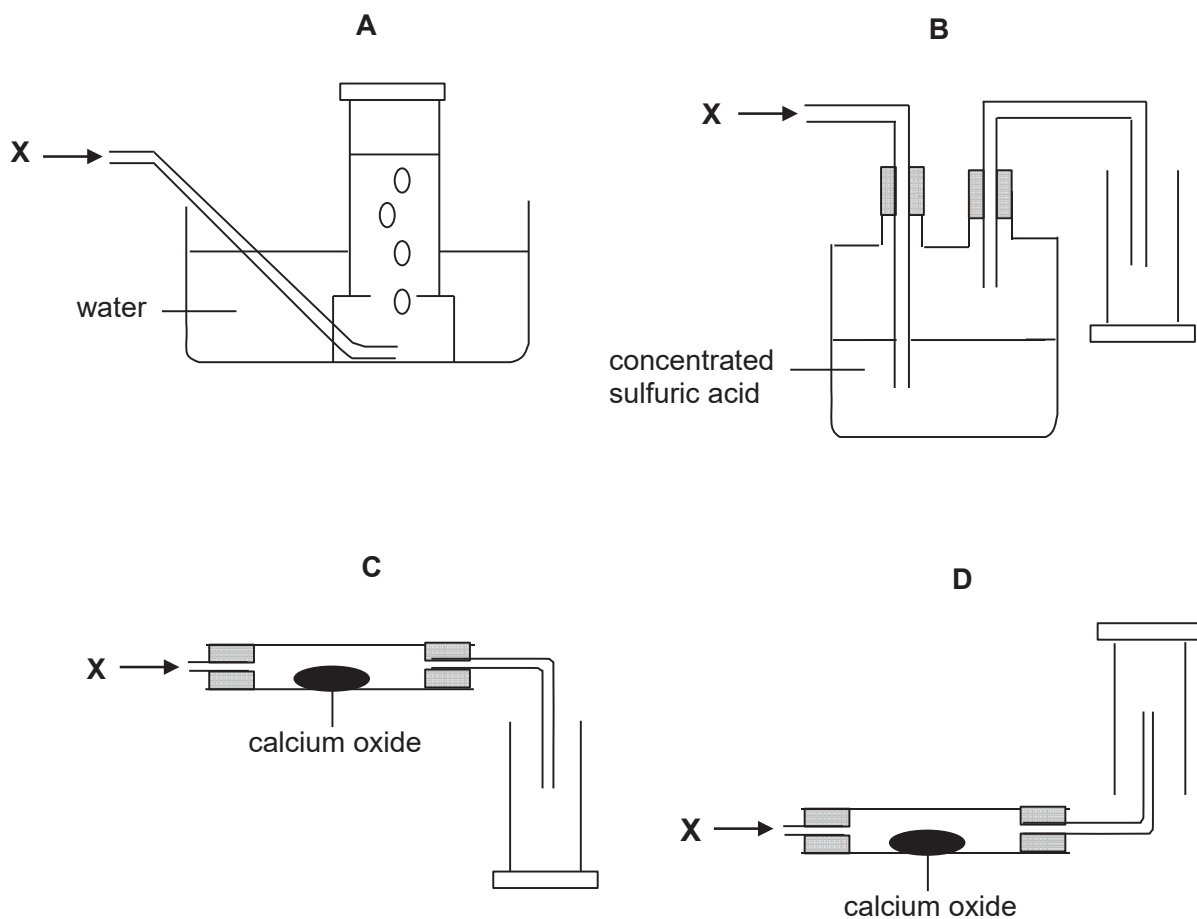
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- 1 A basic gas **X** is denser than air and is very soluble in water.

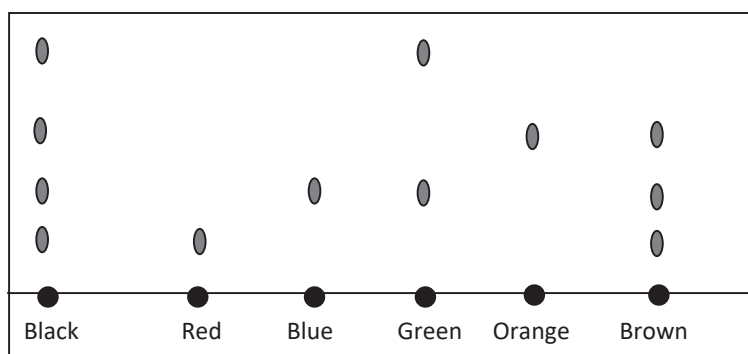
Which method is used to collect a dry sample of the gas?



- 2 Which changes will occur when a liquid at room temperature becomes a gas?

	energy of particle	separation of particles
A	decrease	increase
B	decrease	decrease
C	increase	decrease
D	increase	increase

- 3 A chromatogram of several inks is shown below.



Which of the following three inks, when mixed, does **not** obtain black ink?

- A blue, green, brown
- B green, orange, brown
- C red, blue, green
- D red, green, brown

- 4 Students are asked to state

- the number of atoms in one molecule of aqueous ammonia; and
- the relative molecular mass, M_r of this alkali.

Which of the following options shows the correct answers?

	number of atoms	M_r
A	3	17
B	4	18
C	4	35
D	7	35

- 5 The table below shows four substances and some of their properties.

substance	effect of heat in air	solid conducts electricity	melting point
W	decomposes to form a solid and a gas	no	fixed
X	forms a basic oxide	no	fixed
Y	melts	yes	fixed
Z	melts	yes	variable

Which of the following statements is true about the substances **W**, **X**, **Y** and **Z**?

- A** **W** is an element.
- B** **X** is a diatomic element.
- C** **Y** can be separated by physical methods.
- D** **Z** is a mixture.

- 6 The following table shows information about elements **X** and **Y**.

element	proton number	mass number
X	11	23
Y	8	17

What is the chemical formula and type of bond of the compound that is formed between **X** and **Y**?

	chemical formula	type of bond
A	X₂Y	covalent
B	XY₂	covalent
C	X₂Y	ionic
D	XY₂	ionic

- 7 Which of the following substances is expected to have low melting and boiling point, is insoluble in water and does not conduct electricity at all?

A CCl_4
B MgO
C NaCl
D PbSO_4

- 8 0.1 mol/dm^3 hydrochloric acid reacts with 25 cm^3 of 0.2 mol/dm^3 aqueous sodium carbonate.

The equation for the reaction is shown.



What is the volume of acid required to neutralise exactly this volume of sodium carbonate?

A 6.25 cm^3
B 25 cm^3
C 50 cm^3
D 100 cm^3

- 9 Solutions of two chemicals are mixed. A reaction occurs and the temperature change is measured.

Which statement is correct?

A If the reaction is endothermic, energy is taken in and the temperature of the mixture decreases.
B If the reaction is endothermic, energy is given out and the temperature of the mixture increases.
C If the reaction is exothermic, energy is given out and the temperature of the mixture decreases.
D If the reaction is exothermic, energy is taken in and the temperature of the mixture increases.

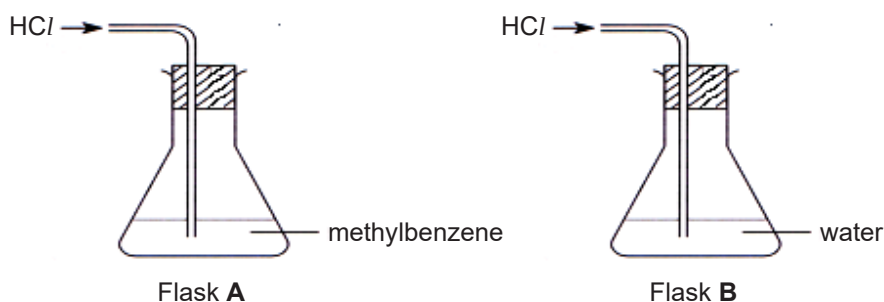
- 10 Acidified aqueous solution **X** is added to compound **Y**.

Solution **X** changes from purple to colourless. What can **X** and **Y** be?

	solution X	compound Y
A	potassium manganate (VII)	reducing agent
B	iodine solution	reducing agent
C	potassium manganate (VII)	oxidising agent
D	iodine solution	oxidising agent

- 11 Hydrogen chloride gas is soluble in both methylbenzene, an organic solvent, and in water.

In an experiment, hydrogen chloride gas is bubbled into the different solvents.



When a few drops of Universal Indicator solution is added into flask **A**, the indicator remained green but when added to flask **B**, it turned red. What could be the reason?

- A** HCl does not produce hydrogen ions in methylbenzene.
 - B** HCl undergoes a redox reaction with methylbenzene.
 - C** HCl neutralises the Universal Indicator solution.
 - D** HCl neutralises methylbenzene.
- 12 Which of the following oxides can react with both acids and alkalis?
- A** lead(II) oxide
 - B** calcium oxide
 - C** iron(II) oxide
 - D** copper(II) oxide

- 13 The following shows part of the Periodic Table. The letters do not represent the actual symbols of the elements.

Period	Group								
	I	II		III	IV	V	VI	VII	0
1									
2	U	S						T	
3	Y							Z	

Which one of the following statements is **false**?

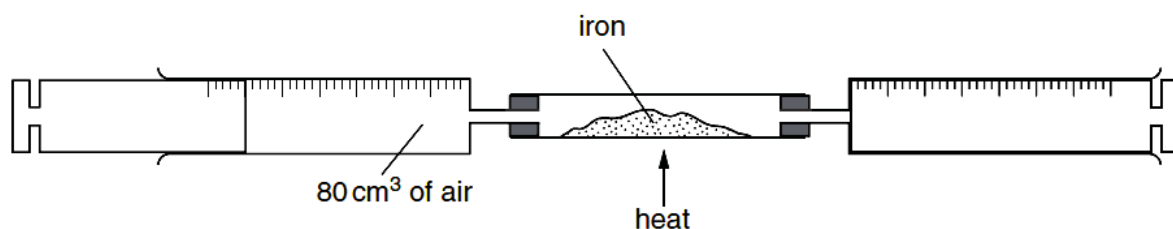
- A** **U**, **S** and **Y** are metals, while **T** and **Z** are non-metals.
- B** **Y** has a higher boiling and melting point than **U**.
- C** The compound formed between **S** and **T** has the formula of **ST₂**.
- D** The oxides of **U**, **Y** and **S** are basic.
- 14 Stainless steel is used to make cutlery. Aluminium is used to make food containers.
- Which property do both stainless steel and aluminium have that makes them suitable for these uses?
- A** They are very strong.
- B** They are good conductors of heat.
- C** They are good conductors of electricity.
- D** They are resistant to corrosion.
- 15 Which reaction occurring in the blast furnace is a neutralisation reaction?
- A** $\text{C} + \text{CO}_2 \rightarrow 2\text{CO}$
- B** $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
- C** $\text{CaO} + \text{SiO}_2 \rightarrow \text{CaSiO}_3$
- D** $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$

- 16 Metals **X** and **Y** display the chemical behaviours as shown below when added to the various solutions.

aqueous solution	metal X added	metal Y added
magnesium nitrate	no reaction	no reaction
zinc nitrate	zinc displaced	no reaction
iron(II) nitrate	iron displaced	no reaction
copper(II) nitrate	copper displaced	copper displaced

Which of the following is the correct arrangement of metals in order of decreasing reactivity?

- A magnesium, **X**, zinc, iron, **Y**, copper
B magnesium, zinc, iron, **X**, **Y**, copper
C magnesium, **X**, zinc, iron, copper, **Y**
D **X**, magnesium, zinc, iron, **Y**, copper
- 17 An 80 cm³ sample of air is trapped in a syringe. The air is slowly passed over heated iron in a tube until there is no further decrease in volume.



When cooled to the original temperature, what is the volume of gas remaining?

- A 17 cm³
B 21 cm³
C 63 cm³
D 80 cm³

18 Which of the following hydrocarbons would you expect to find in petroleum gas?

- A** C_3H_8
- B** C_7H_{14}
- C** $C_{16}H_{34}$
- D** $C_{20}H_{22}$

19 Which of the following petroleum fractions is correctly matched to its use?

	fraction	use
A	bitumen	as feedstock for chemical industry
B	naphtha	for making roads
C	lubricating oil	for making polishes and waxes
D	diesel oil	as jet fuel

20 When petrol is burnt, gases are produced.

Which gas is toxic and is produced by incomplete combustion of petrol?

- A** carbon dioxide
- B** carbon monoxide
- C** oxides of nitrogen
- D** water vapour

Data Sheet

Colours of Some Common Metal Hydroxides

calcium hydroxide	white
copper(II) hydroxide	light blue
iron(II) hydroxide	green
iron(III) hydroxide	red-brown
lead(II) hydroxide	white
zinc hydroxide	white

Group																	
I	II	1 H hydrogen 1					III	IV	V	VI	VII	0					
Key proton (atomic) number atomic symbol name relative atomic mass																	
3 Li lithium	4 Be beryllium																
11 Na sodium	12 Mg magnesium																
23	24																
19 K potassium	20 Ca calcium	21 Sc scandium	22 Ti titanium	23 V vanadium	24 Cr chromium	25 Mn manganese	26 Fe iron	27 Co cobalt	28 Ni nickel	29 Cu copper	30 Zn zinc	31 Ga gallium	32 Ge germanium	33 As arsenic	34 Se selenium	35 Br bromine	36 Kr krypton
37 Rb rubidium	38 Sr strontium	39 Y yttrium	40 Zr zirconium	41 Nb niobium	42 Mo molybdenum	43 Tc technetium	44 Ru ruthenium	45 Rh rhodium	46 Pd palladium	47 Ag silver	48 Cd cadmium	49 In indium	50 Sn tin	51 Sb antimony	52 Te tellurium	53 I iodine	54 Xe xenon
85	88	89	91	93	96	-	101	103	106	108	112	115	119	122	128	127	131
55 Cs caesium	56 Ba barium	57 – 71 lanthanoids	72 Hf hafnium	73 Ta tantalum	74 W tungsten	75 Re rhenium	76 Os osmium	77 Ir iridium	78 Pt platinum	79 Au gold	80 Hg mercury	81 Tl thallium	82 Pb lead	83 Bi bismuth	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	117	118	119	120

actinoids

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).