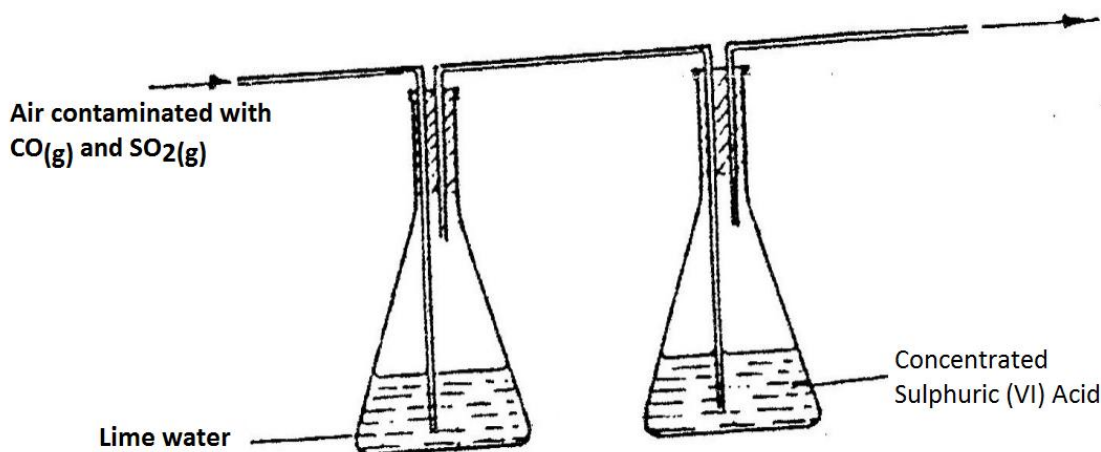


FORM TWO CHEMISTRY MARKING SCHEME

1. Complete the table below for the characteristics of the sub atomic particles(2marks)

sub atomic particle	Relative mass	Electrical charge
Proton	1	$1 \sqrt{1}$
neutron	1	$0 \sqrt{1}$

2. A sample of air contaminated with carbon monoxide and sulphur (IV) oxide was passed through the apparatus shown in the diagram below.



Which contaminant was removed by passing the contaminated air through the apparatus? Explain.

Sulphur (IV) oxide $\sqrt{1}$, *it reacts with limewater being an acidic gas* $\sqrt{1}$

3. Explain how you would obtain solid lead carbonate from a mixture of lead carbonate and sodium carbonate powders.

Add water $\sqrt{1}$, *filter to remove lead carbonate as a residue* $\sqrt{1}$, *wash and dry the residue* $\sqrt{1}$

4. Describe how the following reagents can be used to prepare copper (II) hydroxide, solid copper (II) sulphate, solid sodium hydroxide and distilled water.

Add distilled water to solid copper (II) sulphate and solid sodium hydroxide in separate beakers to obtain their solutions. $\sqrt{1}$ *mix the solutions to obtain copper (II) hydroxide precipitate* $\sqrt{1}$ *filter, wash and dry the residue* $\sqrt{1}$

5. Aluminium metal is a good conductor and is used for overhead cables. State any other two properties that make aluminium suitable for this use.

Has low density// it is light $\sqrt{1}$

Forms a protective oxide coating on its surface $\sqrt{1}$

6. Type of change

- I Physical
- II Chemical

Reason

- Change to gas then back to solid
- New substance formed

III Physical

Color changes to yellow then back to white

7. The table below shows the relative molecular masses and the boiling points of methane and water

	Relative molecular mass	Boiling point(°C)
Methane	16	-161
Water	18	100

Explain why the boiling point of water is higher than that of methane.

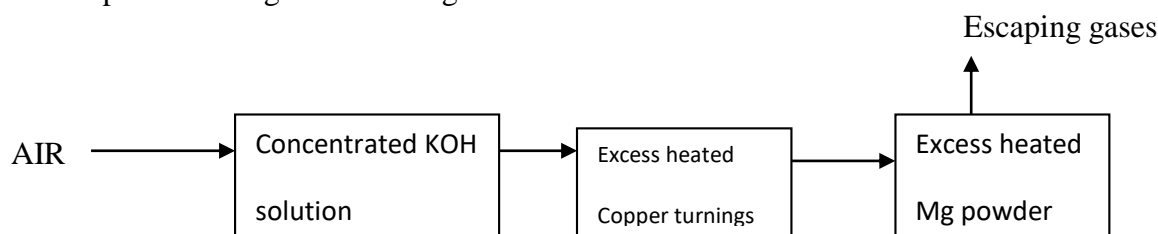
The molecules of water interact through strong hydrogen bonding √1 while molecules of methane have weak van der Waals forces √1

8. (a) J is basic

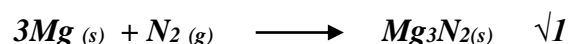
Bases turn litmus blue and methyl orange yellow

(b) Water, NaCl (any neutral substance)

9. Air was passed through several reagents as shown in the flow chart below.



- (a) Write an equation for the reaction, which takes place in chamber with magnesium powder



- (b) Name one gas, which escapes from the chamber containing magnesium powder. Give a reason for your answer.

Argon // Neon (name of a noble gas) √1

Because they are inert and not likely to have reacted with any of the reagents. √1

10. a) To occupy space previously occupied by oxygen that was used by smouldering phosphorous. ✓01

- b) Because oxides of phosphorous formed still occupy space previously occupied by oxygen.



- c) Let all the fumes dissolve in water before final reading is taken ✓01

11. (a) M & L

(b) NL_3

(c) Ionic radii is bigger. It gains electrons to form ions

12. In temperate countries, salt is sprayed on roads to defrost and clear roads but the long term effect on this practice is costly to motorist.

(a) Explain the role of salt in defrosting the ice. (1mk)

It acts as an impurity in the ice hence lowering its melting point. ✓ ½

(b) Explain why the long term effect is costing to motorists. (1mk)

Salt accelerates the rate of rusting of the iron parts of the motor vehicles. ✓ ½

13. The grid below shows part of a periodic table. The letters do not represent the actual symbols of the elements

F																			

(i) a) Element which has the largest atomic radius.

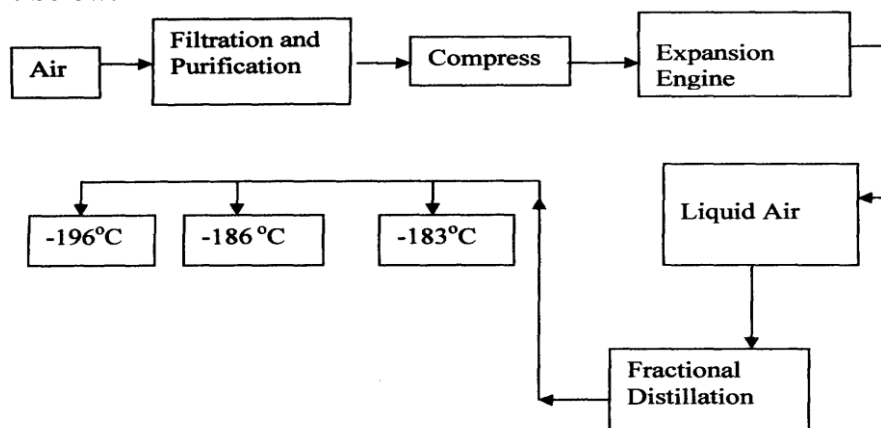
F ✓1

(ii) Most reactive non-metal.

I ✓1

b) Show on the grid the position of the element J which forms J^{2-} ions with electronic configuration 2, 8, 8. (1mk)

14. Oxygen is obtained on large scale by the fractional distillation of air as shown on the flow chart below.



a) Explain why air is considered as a mixture (1mk)

- Various components can be separated using a physical means / method.
- Components in air are not in fixed proportions.

Any 1 x 1 = 1 mk

b) Identify the substance that is removed at the filtration stage (1mk)

- dust particles ✓1

c) Explain why Carbon (IV) oxide and water are removed before liquefaction of air

(1mk)

- They would readily solidify ✓ ½ and block the pipes ✓ ½

d) Identify the component that is collected at -186°C

(1mk)

Argon ✓1

15. Study the table below and answer the questions that follow:-

Substance		A	B	C	D	E	F
Melting Point (°C)		801	113 OR 119	-39	5	-101	1356
Boiling point (°C)		1410	445	457	54	-36	2860
Electrical	Solid	Poor	Poor	Good	Poor	Poor	Poor
Conductivity	liquid	Good	Poor	Good	Poor	Poor	Poor

Identify with reasons the substances that:

(i) Have a metallic structure (2mks)

C ✓1 Good conductor of electricity ✓1 in both solid and liquid state due to delocalised

(ii) Have a molecular structure (2mks)

D or E ✓1 Are poor conducts in both solid / liquid state.
Have relatively low M.P and B.P due to molecular structure.

(iii) Suggest a reason why substance B has two melting points (1mk)

Exists as allotropes ✓1

(iv) Substances A and C conduct electric current in the liquid state. State how the two

substances differ as conductors of electric current (2mks)

A – mobile / free ions

B – Delocalized electrons

16. Atoms of element X exists as ${}^{14}_6\text{X}$ and ${}^{12}_6\text{X}$

(a) What name is given to the two types of atoms.

Isotope ✓1

(b) Use dot (·) and cross (x) diagrams to illustrate the atomic structure of ${}_{6}^{14}\text{X}$

Nucleus composition ✓1

Ec 2.4 ✓1

17. (a) Give 2 reasons why most laboratory apparatus are made of glass. (1mk)

- Glass does not react with most chemicals ✓ ½
- It is transparent one can see when reaction is taking place. ✓ ½
- It is easy to clean. ✓ ½ any 2

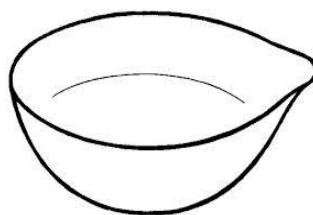
(b) The diagrams below are some common laboratory apparatus. Name each apparatus and state its use.

(2mks)



Name: Desiccator

Use Drying or keeping substances from moisture



Name Evaporating dish

Use Evaporating liquids to obtain crystals

18. Soot is one of the environmental pollutants .

(i) Explain the term pollutant.

Harmful substance released into the environment ✓1

(ii) State how soot is formed from hydrocarbons.

Soot is formed when hydrocarbons burns in a limited supply of oxygen ✓1 // *incomplete combustion*

19. (a) (i) Phosphorus (III) oxide

(ii) Phosphorus (V) oxide

(b) Acidic

20. (a) (i) Smallest particle of an element that can take part in a chemical reaction.

(ii) Number of protons and neutrons in the nucleus of an atom.

(b) $T_2(SO_4)_3$

Chips

21. Crystals of sodium carbonate decahydrate ($Na_2CO_3 \cdot 10H_2O$) were exposed to air for about four days.

(i) State what was observed.

A white powder was formed $\sqrt{1}$

(ii) Name the process that took place.

Efflorescence $\sqrt{1}$

(ii) Write an equation for the reaction that occurred.



22. Explain why molten calcium chloride conducts electricity while silicon (IV) oxide does not.

Molten calcium chloride contains delocalized ions which carry charge $\sqrt{1}$ *but silicon (IV) oxide does not* $\sqrt{1}$

23. The table below gives the first ionization energy of three elements.

Element	A	B	C
1 st ionization energy(kJ/mol)	496	419	520

(i) Define the term first ionization energy.

First ionization energy is the minimum amount of energy required to remove the first electron

From a gaseous atom ✓1

(ii) select the element that is the most reactive. Explain.

B ✓1 *it has the least ionization energy therefore loses electrons most readily* ✓1

30. State the colour of the indicators in the solutions given in the table below:

Indicator	Colour in	
	Acid	Base
Litmus	Red	<i>Blue</i> ✓1
Methyl orange	<i>Orange</i> ✓1	Yellow
Phenolphthalein	Colourless	<i>Pink</i> ✓1