

MARKING SCHEME

233/2
CHEMISTRY
PAPER 2
(THEORY)

Q1=10 marks
Q2=10 marks
Q3=10 marks
Q4=12 marks
Q5=8 marks

M/SCH

Reg ✓ 1mk
✓ 1/2mk

Q1. grid below shows part of the periodic table. Study it and answer the questions that follow. The letters do not represent the true symbols of the elements.

					A		
I	B		C		D		E
F	G						H

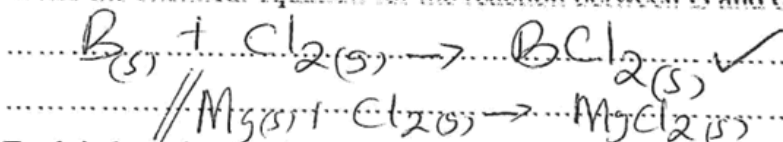
a) Which element forms an ion of charge - 2? Explain your answer

2marks

Ans. A ✓
has 2:6 E.C hence requires 2 e⁻ to form ion

d) Write the chemical equation for the reaction between B and chlorine?

1 mark



e) Explain how the atomic radii of the following compare;

2 marks

i) F and G

F bigger than G ✓

G has more protons hence e^- strongly attracted towards nucleus ✓

ii) B and G

G bigger than B ✓

G has more energy levels ✓

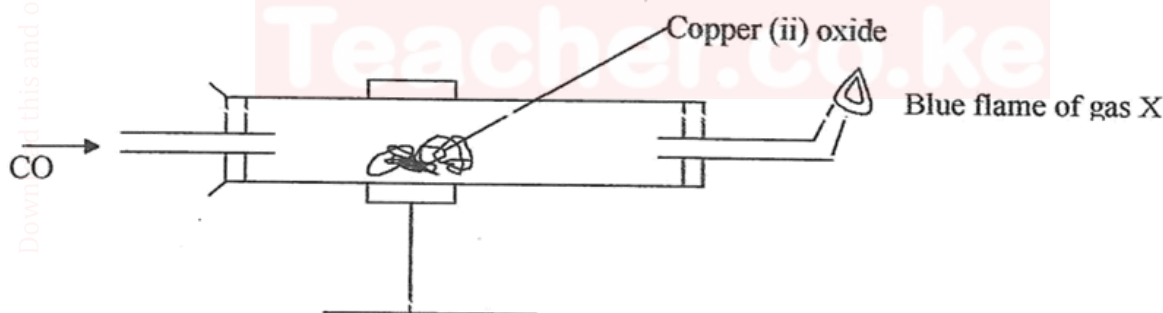
f) The oxides of B and D are separately dissolved in water. State the effect of each product on litmus paper.

2 marks

Oxide of B is basic changing red litmus to blue ✓

Oxide of D acidic changing blue litmus to red ✓

Q 2. The diagram below shows an experiment set-up to investigate a property of carbon (ii) oxide. Study it and answer the questions that follow.



a) Name one condition that is missing in the set up that must be present if the experiment to proceed.

1 mark

Heat ✓

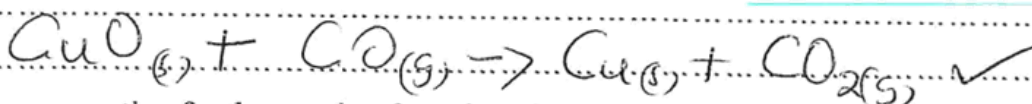
b) If the experiment was carried out properly. What observation would be made in the combustion tube?

1 mark

black CuO changes to brown ✓

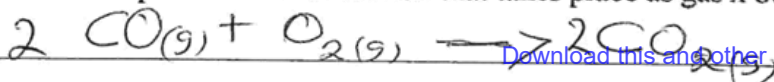
c) Give an equation for the reaction that occurs in the combustion tube.

1 mark



d) Give an equation for the reaction that takes place as gas x burns.

1 marks



e) Why is it necessary to burn gas x?

1mk

Minimise Pollution: Since CO is toxic ✓
// Convert CO to CO₂ which is less pollutant.

f) Name the reducing and oxidizing agent.

2marks

(i) Reducing Carbon(II) Oxide ✓

(ii) Oxidising agent Copper(II) Oxide ✓

g) Identify any other substance that would have the same effect on copper (ii) oxide as carbon (ii) oxide.

1mark

Hydrogen ✓
// Ammonia // Carbon

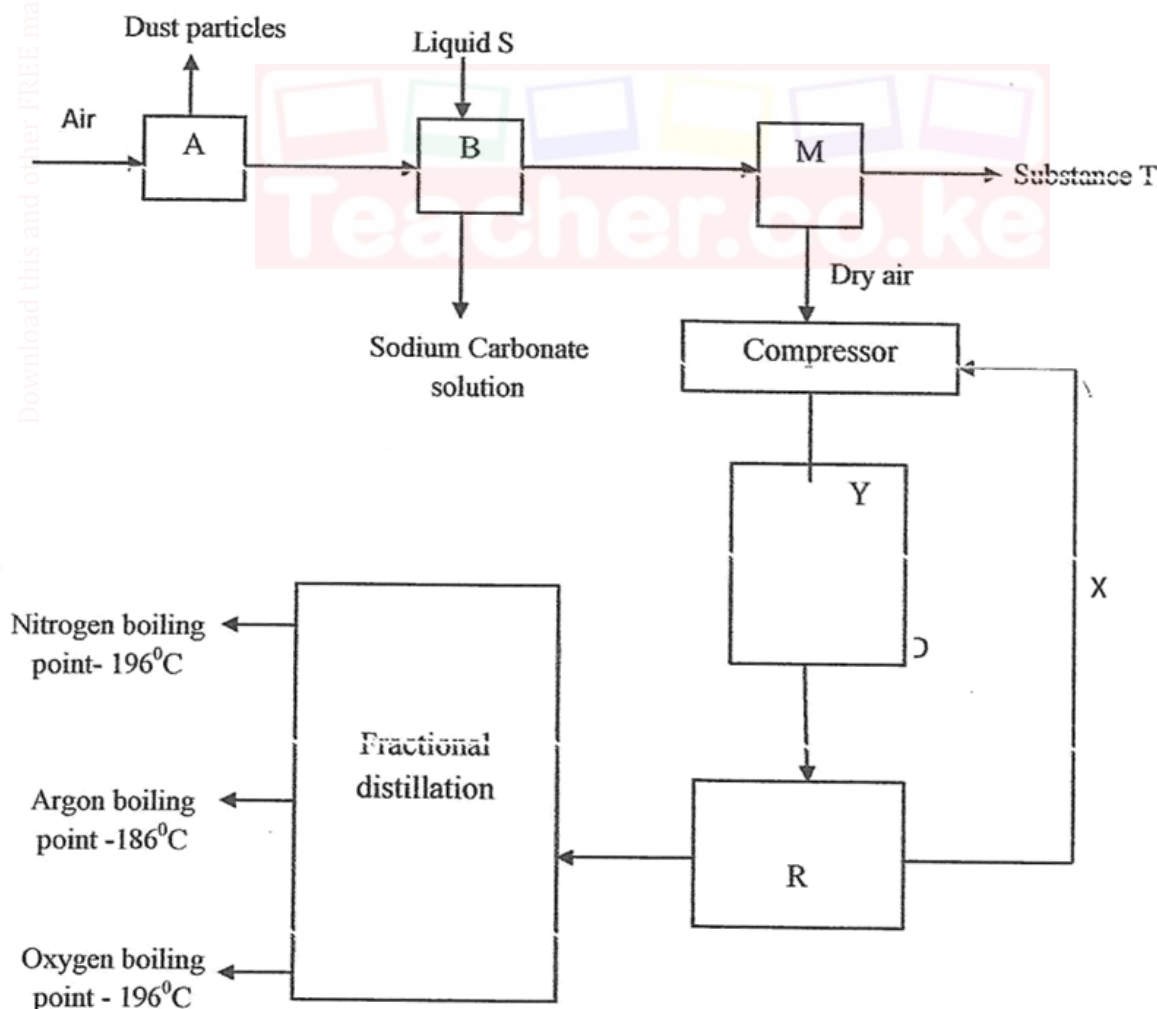
h) What would happen if copper (ii) oxide was replaced with sodium oxide? Explain

2mark

No reaction ✓

CO cannot remove oxygen from Na₂O since it is less reactive ✓

Q3. Fractional distillation of air is used in the industrial manufacture of oxygen. The diagram below shows the process.



a) What processes are taking place in chamber A, B, M and D

2marks

Electrostatic precipitation ✓

A Electrostatic Precipitation ✓

B Absorption of CO_2 in NaOH ✓

M Coding to remove moisture ✓

D Condensation ✓

b) Name;

(i) Liquid S

Sodium hydroxide solution ✓

(ii) Substance T

Water // Ice ✓

c) Explain why part Y in chamber D is curved?

1 mark

To increase S.A for heat loss ✓

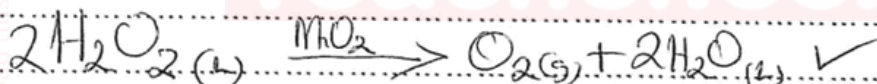
d) Give two industrial uses of oxygen gas?

2 marks

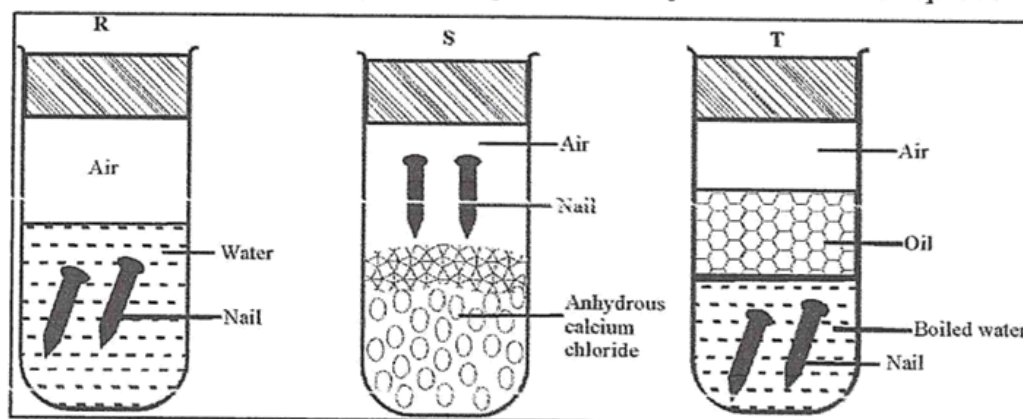
- O_2 - hydrogen flame to cut metals ✓
- in purification of iron to make steel ✓

e) In the laboratory preparation of oxygen, manganese (iv) oxide and hydrogen peroxide are used. Write an equation to show how oxygen gas is formed.

1 mark



f) An investigation was carried out using the set-up below. Study it and answer the questions that follow.



(i) State and explain what will happen in the three test-tubes R, S and T after seven days.

3 marks

(R) Intense rusting due to presence of air & moisture ✓

(S) & (T) No rusting. No moisture in S & No oxygen in T ✓

(ii) Give one reason why some metals are electroplated.

1 mark

To prevent them from rusting ✓
// Make them attractive

4. The formula of three organic compounds each having two carbon atoms are;

Compound	A	B	C
formula	C_2H_4	C_2H_2	C_2H_6

The compound belong to different homologous series.

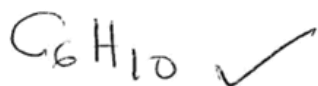
a) State what is meant by the term *homologous series*

(1mk)

Group of compound with similar chemical properties, similar general method of preparation & have general formula $-CH_2$

b) Compound B is the first member of a homologous series, write the formula of the fifth member of the same series.

(1mk)

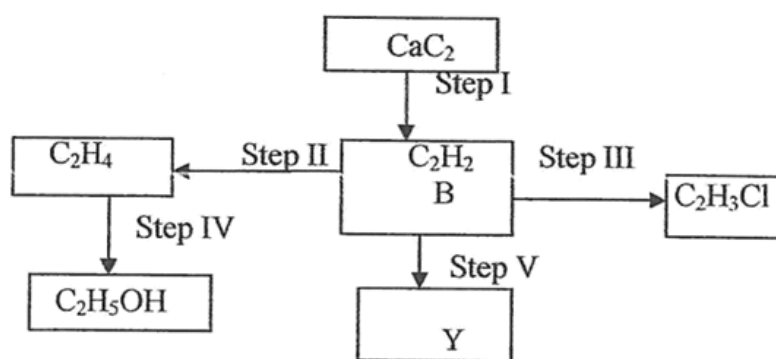


c) Explain why compound A is described as being unsaturated.

(1mk)

Has double bond, the C atom doesn't have maximum number of hydrogen atom that can possibly bond to it. ✓

d) The flow chart below shows reaction involving B.



i) Name the reagent used in step I.

(1mk)

Step II

— Hydrogen ✓
— HCl ✓

ii) Identify the type of reaction taking place in

Step III.

(1mk)

Addition of hydrogen chloride ✓

Step IV

(1mk)

Hydrolysis / hydration ✓

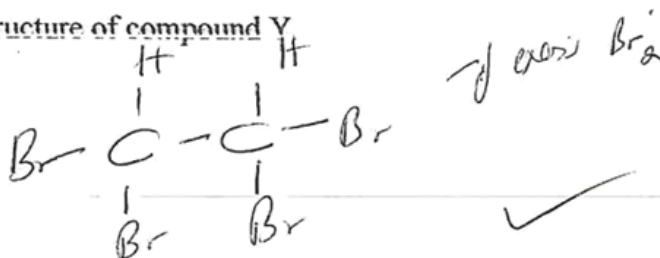
iii) State the conditions necessary in carrying out step II.

(2mks)

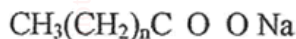
— Nickel / Platinum ✓
— $200^{\circ}C$ ✓

iv) Draw the structure of compound Y

(1mk)



e) The following is a structure of soap.



i) Give the name of the main raw material used in making soaps.

(1mk)

Handwritten answer: Sodium hydroxide & oil / fat / tri-ester ✓

ii) Given two soaps, one with $n=16$ and another $n=10$, explain which of the soap is more effective in washing clothes.

(2mks)

Handwritten answer: $n=16$ has longer tail which attracts non-polar dirt - more effective ✓

5. a) i) Name the two types of hardness.

(2mk)

Handwritten answers: Temporary hardness ✓
Permanent hardness ✓

ii) Name the compound responsible for each type of hardness.

(2mk)

Handwritten answer: Temporary H $\Rightarrow \text{Ca}(\text{HCO}_3)_2$ or $\text{Mg}(\text{HCO}_3)_2$ ✓

Handwritten answer: Permanent H \Rightarrow Mg salt / Ca / Mg salt / chloride ✓

iii) State one source of calcium ion in river water.

(1mk)

Handwritten answer: Limestone combine with water & CO_2 forming $\text{Ca}(\text{HCO}_3)_2$ ✓

iv) Name two methods of removing permanent hardness.

(2mks)

Handwritten answers: Distillation ✓
Ion exchange resin ✓ // use of Na_2CO_3

v) Write the chemical formula of the two complex ion formed when ammonium solution reacts with cation.

(2mks)

