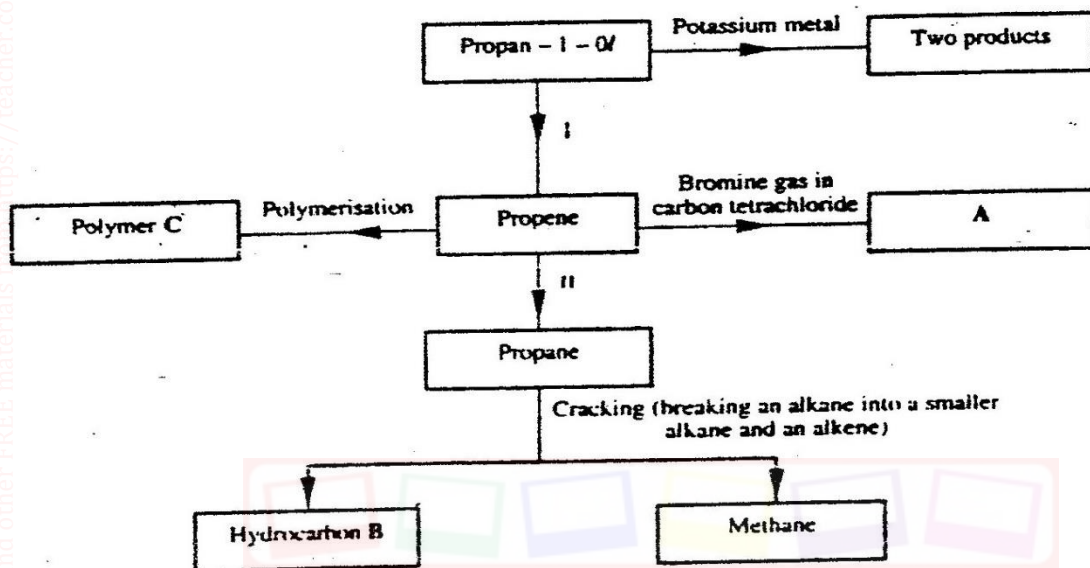
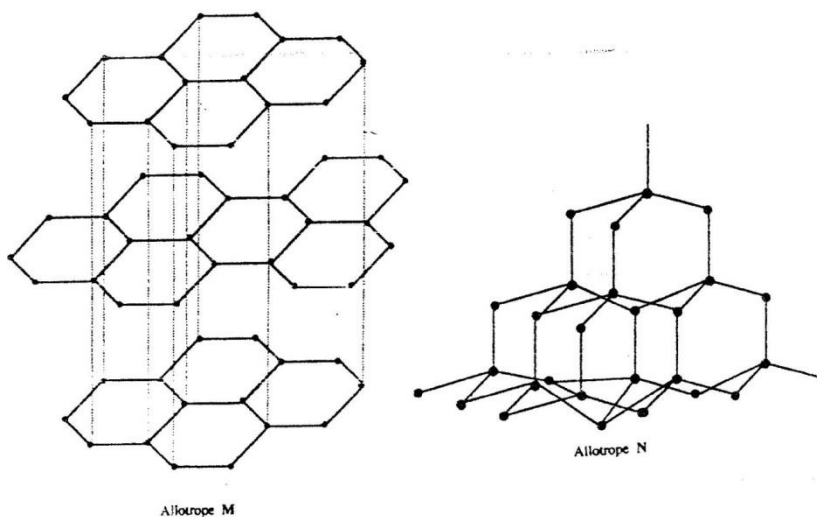


**FORM FOUR CHEMISTRY
HOLIDAY ASSIGNMENT
APRIL, 2024**

1. a) In which homologous series do the following compounds belong
- CH_3CCH (1mk)
 - $\text{CH}_3\text{CH}_2\text{COOH}$ (1mk)
- b) Raw rubber is heated with sulphur in the manufacture of natural rubber.
- What is the name given to the process? (1mk)
 - Why is the process necessary? (1mk)
- c) Study the scheme given below and answer the questions that follow.

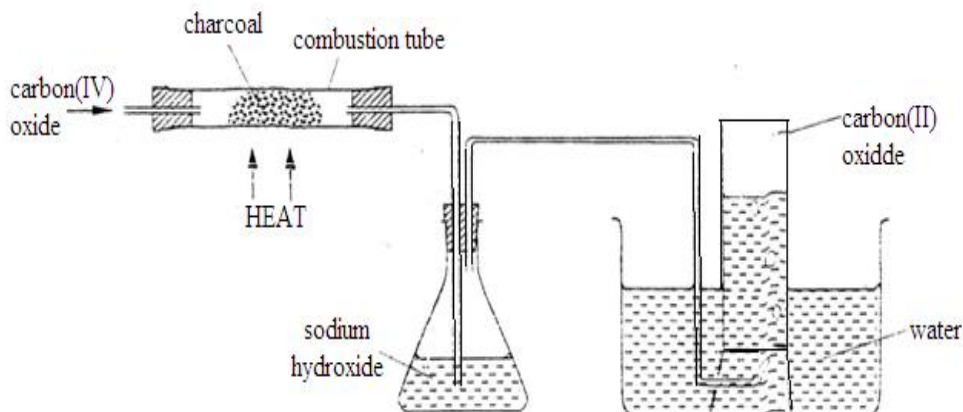


- Write an equation for the reaction between propan-1-ol and potassium metal.
 - Name processes I and II (2mks)
 - Identify the products A and B (2mks)
 - Name one catalyst used in process II (1mk)
 - Draw the structural formula of the repeating unit in the polymer C. (1mk)
 - State two industrial uses of methane. (2mk)
2. (a) The following diagrams show the structures of two allotropes of carbon. Study them and answer the questions that follow

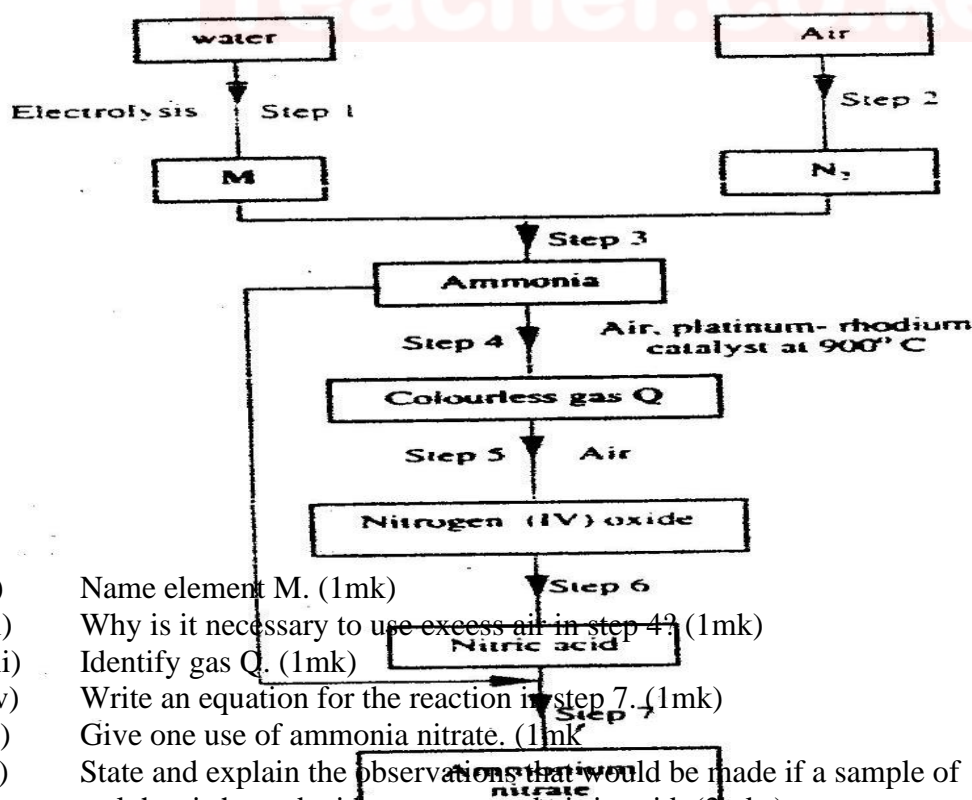


- What is meant by the term allotropy? (1mk)
- Name allotrope M and N. (2mk)

- (iii) Give one use of N (1mk)
 (iv) Which allotrope conducts electricity? Explain (2mk)
 (b) In an experiment, carbon (IV) oxide gas was passed over heated charcoal and the gas produced collected as shown in the diagram below



- (i) Write an equation for the reaction that took place in the combustion tube (1mk)
 (ii) Name another substance that can be used instead of sodium hydroxide ((1mk)
 (iii) Describe a simple chemical test that can be used to distinguish between carbon (IV) oxide and carbon (II) oxide (3mk)
 (iv) Give one use of carbon (II) oxide (1mk)
 3. a) Fraction distillation of liquid air usually produces nitrogen and oxygen as the major products.
 i) Name one substance that is used to remove carbon (IV) oxide from the air before it is changed into liquid. (1mk)
 ii) Describe how nitrogen gas is obtained from the liquid air. (2mk)
 (Boiling points nitrogen = -196°C , oxygen = -183°C)
 (b) Study the flow chart below and answer the questions that follow.



- i) Name element M. (1mk)
 ii) Why is it necessary to use excess air in step 4? (1mk)
 iii) Identify gas Q. (1mk)
 iv) Write an equation for the reaction in step 7. (1mk)
 v) Give one use of ammonium nitrate. (1mk)
 c) State and explain the observations that would be made if a sample of sulphur is heated with concentrated nitric acid. (2mks)
 4. (a) An atom Q can be represented as ^{52}Q .

What does the number 52 represent? (1mk)

(b) Study the information in the table below and answer the equations that follow. (Letters are not the actual symbols of the elements)

Element	Electronic arrangement of stable ion	Atomic Radius (nm)	Ionic Radius (nm)
N	2.8.8	0.197	0.099
P	2.8.8	0.099	0.181
R	2.8	0.160	0.065
S	2.8	0.186	0.095
T	2	0.152	0.068
U	2.8	0.072	0.136

(i) Write the formula of the compound formed when N reacts with P.
(Atomic numbers are N = 20; P = 17) (1mk)

(ii) Identify the elements which belong to the third period of the periodic table. Explain.

(iii) Which of the element identified in b (ii) above comes last in the third period? Explain

(iv) Select two elements which are non- metals (1mk)

(c) The table below gives some properties of substances I, II, III, and IV. Study it and answer the questions that follow

Substance	Electrical conductivity		M.P ($^{\circ}$ C)	B.P ($^{\circ}$ C)
	Solid	Molten		
I	Does not conduct	Conducts	801	1420
II	Conducts	Conducts	650	1107
III	Does not conduct	Does not conduct	1700	2200
IV	Does not conduct	Does not conduct	113	440

(i) What type of bonding exists in substances I and II (1mk)

(ii) Which substances is likely to be sulphur? Explain (2mks)