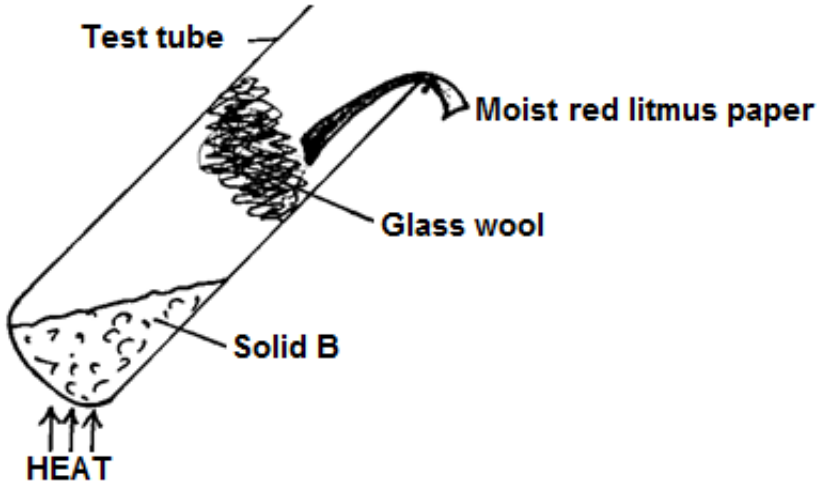
1. When steam was passed over heated charcoal, hydrogen and carbon (II) oxide gas were formed.

   a) Write the equation for the reaction which takes place.

   .....
   .....

   b) Name two uses of carbon (II) oxide gas which are also uses of hydrogen gas.

2. When a solid B was heated in a test tube, it gave off two gases. The two gases were separated by passing them through a plug of glass wool in a test – tube as shown below.



   The first gas which evolved turned moist red litmus paper to blue. Later the other gas evolved turned the Litmus back to red.

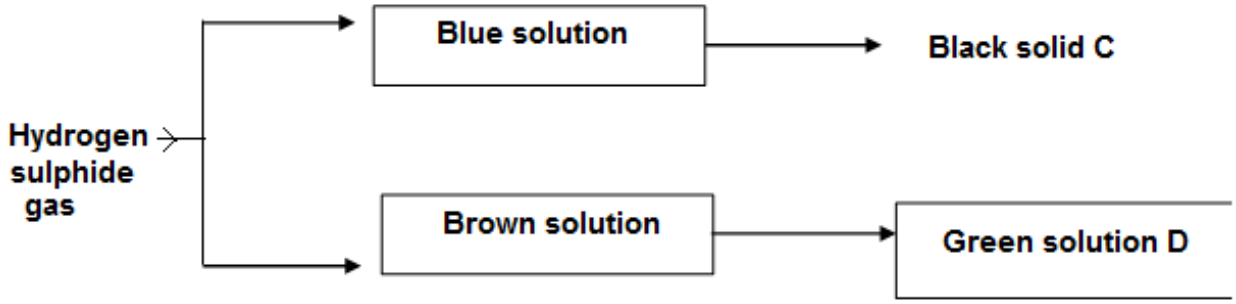
   a) Identify solid B.

   .....
   .....

   b) Write the equation for the reaction that take place in the test tube.

   .....

3. Hydrogen sulphide gas was bubbled into two solutions of metallic nitrates as shown in the flow diagram below.



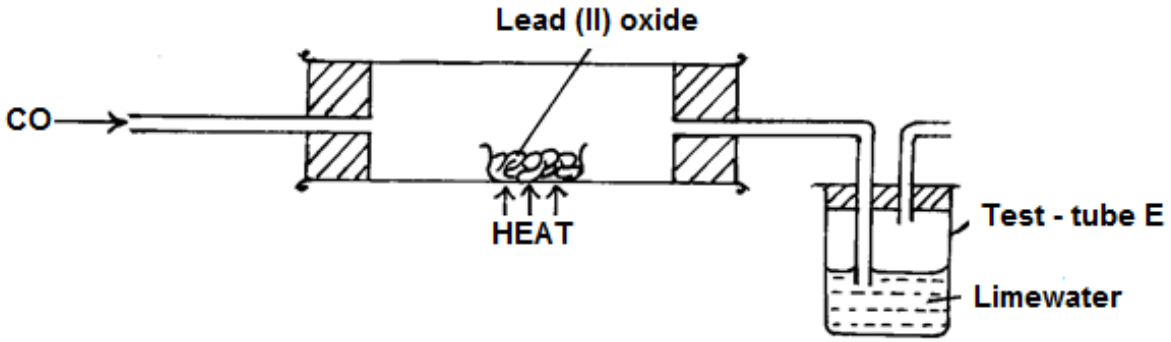
   a) Identify the black solid C.

   .....

b) Write an ionic equation for the formation of the green solution.

.....

4. The apparatus shown below was used to investigate the effect of carbon (II) oxide on lead (II) oxide.



a) State the observation made in the combustion tube during the experiment. (1mark)
.....
.....

b) Write the equation for the reaction that take place in test – tube E.

5. A white solid dissolve in water to form a colourless solution. The colourless solution forms a white precipitate (X) with ammonia solution but dissolve in excess alkali. The colourless solution forms a white precipitate Y with Lead (II) Nitrate solution. The white precipitate dissolve on warming to form a colourless solution.

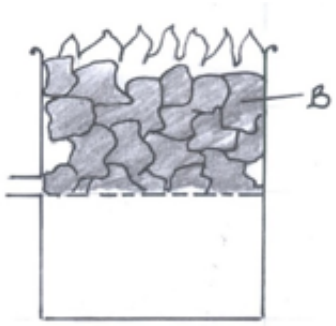
a) Write the chemical formula for the ion formed when the colourless solution react with excess ammonia solution. .....
.....

b) Name white precipitate Y

.....
.....

c) What is an alkali.

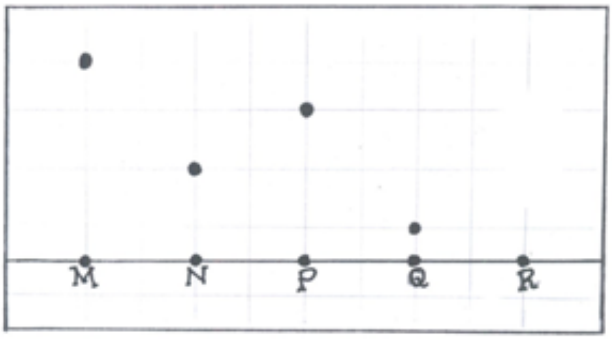
6. Below is a cross –section of a charcoal burner.



a) Charcoal is a form of impure carbon. Name two other allotropes of carbon.
.....
.....

b) Write an equation for the reaction taking place at the part marked B.

7. The diagram below represents paper chromatogram of four types of sugar.



a) Identify the least soluble sugar.

.....

b) On the diagram show the chromatogram of R if it is a mixture of N and P

8. The empirical formula of hydrocarbon is C_2H_3. The hydrocarbon has a relative molecular mass of 54 (H=1, C= 12)

a) Determine the molecular formulae of the hydrocarbon.

.....
.....

b) Draw the structural formulae of the hydrocarbon in (a)

.....
.....

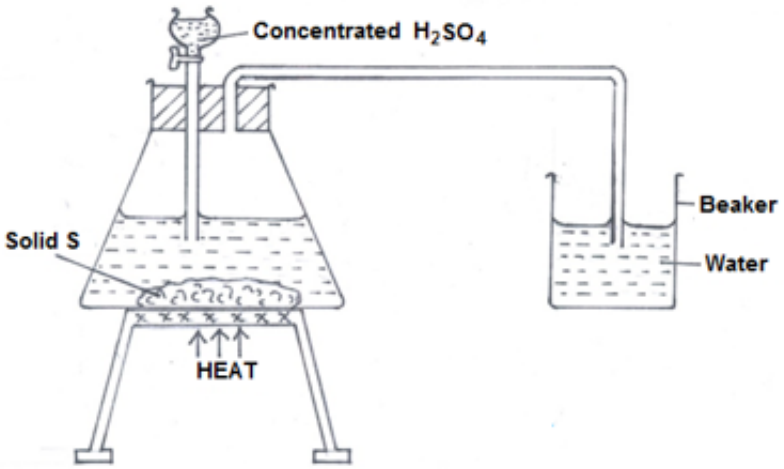
c) To which homologous series does the hydrocarbon in (b) above belong?
.....

9. In terms of structure and bonding, explain the following. a) Melting point of magnesium is higher than that of sodium. .....
.....

b) Melting point of chlorine is lower than that of iodine.

.....
.....

10. The set- up below was used to prepare a solution of hydrogen chloride



a) Identify solid S.

.....

b) Identify one mistake in the set-up

c) Write an equation for the reaction taking place in the conical flask.

11. a) State Gay Lussac's Law

b) 10cm3 of a gaseous hydrocarbon. CxHy required 30cm^3 of oxygen for complete combustion. If steam and 20cm3 of carbon (IV) oxide were produced, what is the value of X in CxHy.

12. Starting with Zinc oxide, describe how a dry crystalline sample of Zinc sulphate can be prepared in the laboratory. .....

13. An ion I-2 has an electronic arrangement of 2.8. a) What is the atomic number of the element?
.....
.....

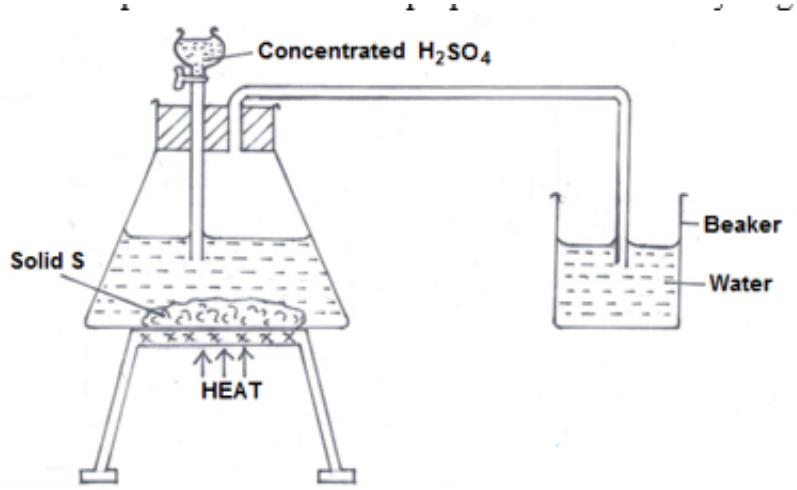
b) To which group and period does the element belong to:

Group.....

Period.....

14. Using dot (.) and cross (x) diagram show the type of bond present in hydroxonium H_3O

15. A mixture of hydro gen gas and carbon (IV) oxide are passed through potassium hydroxide solution as shown below.



a) State the observation made in the conical flask.

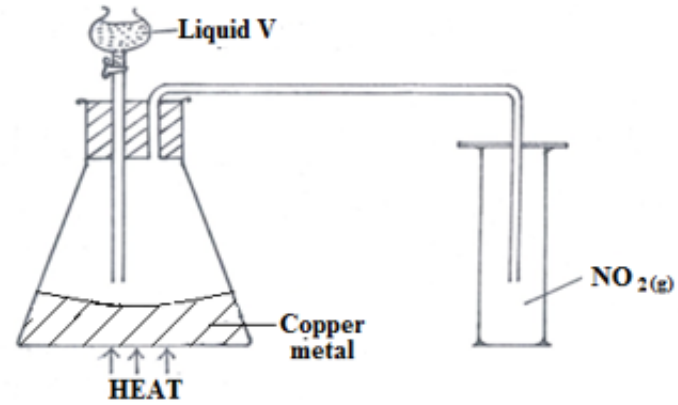
.....
.....

b) Write the equation for the reaction that takes place in: i) The conical flask
.....

16. 20cm3 of a solution containing 4g per litre of sodium hydroxide was neutralized by 8cm3 of dilute sulphuric (VI) acid. Calculate the concentration of the acid in moles per litre. (Na =23.0, O =16, H=1.0)

.....

17. The diagram below is used to prepare nitrogen (IV) oxide gas.



a) Identify substance V.

.....

b) State and explain one precaution taken when carrying out the experiment.

18. State the function of each of the following in the solvay process in production of sodium carbonate.

a) Coke

.....

b) Cold water

.....

c) Ammonia

.....

19. A student in form three was given two gases C_2H_6 and C_2H_4. He bubbled the gases through acidified potassium manganite (VII) in separate test tubes. State the observations the student made.

.....
.....
.....
.....

b) State one use of C_2H_6.

.....

20. A piece of burning magnesium ribbon was placed in a gas jar full of nitrogen gas. The product Q formed was then reacted with water.

a) Write the chemical formula for the product Q and give its name.

b) Write the equation for the reaction between product Q and water

21. . The elements shown in the table below (not actual symbols) belong to a certain family of metals in the periodic table. Study the information and answer the questions that follow.

Element	Atomic size (nm)
S	0.160
T	0.180
V	0.930

a) Define the term ionization energy.
.....

b) Which element is likely to have the highest ionization energy?

Explain .....

22. . A certain mass of copper II carbonate was strongly heated. Given that 300cm3 of carbon IV oxide gas was collected at s.t.p and this represents 83% yield. Determine the mass of copper II carbonate heated (Molar gas volume = 22.4 dm3, Cu =64, O = 16, C=12.)
.....

23. During an experiment, chlorine was bubbled into a solution of sodium bromide in a beaker.

a) State and explain one observation made.

.....
.....

b) Write an ionic equation for the reaction that took place in the beaker. (1mark)
.....

24. . In preparation of oxygen gas, a student used hydrogen peroxide and added a black solid and collected the gas over water. a) What is the name of the black solid and what is its function?

.....
.....

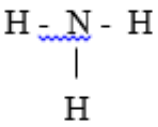
b) During collection of the gas why should the first bubbles be allowed to escape?
.....
.....

c) Why is the gas collected over water?

25. a) Write an equation to show reaction between hydrogen sulphide gas and Sulphur (IV) oxide gas

b) In the above reaction, identify the oxidizing agent. Give a reason

26. . Study the diagram below showing a molecule of ammonia.



How many lone electrons are in the diagram above?

27. Distinguish between a suspension and a precipitate.

28. An element V has relative atomic mass of 39.5 with three isotopes V – 38, V – 39 and V – 40. The percentage abundance of isotope V – 38 is 0.01% determine the percentage of V- 39 and V – 40.

29. What do the following labels on a reagent mean?

a)

b)

30. a) Substance A has a melting point of 115^0C and boiling point of 444^0C.

What is the physical state of A at room temperature? Explain

.....
.....

b) Melting point of sodium chloride is 801^0C but a sample was found to melt at 680^0C.

Give a reason.