

4. In an experiment to prepare Nitrogen (I) oxide, ammonium nitrate was gently heated in a flask.
- Write the equation for the reaction that took place in the flask. (1mk)

 - State and explain how the gas was collected. (1mk)

 - A sample of the gas was tested with damp blue and red litmus paper what observations were made. (1mk)
5. During an experiment sulphur (IV) oxide gas was formed to diffuse through a certain pore at a rate of 25cm^3 per minute. When the experiment was repeated under the same conditions with another gas G, gas G was found to diffuse through the same pore at a rate of 26.26cm^3 per minute. Work out the molecular mass of Gas G. ($O=16, S=32$) (3mks)

6. Element Y whose atomic number 11 react with chlorine gas to form a compound.

a) Name the group and period to which Y belongs. (1mk)

b) Write an equation for the reaction. (1mk)

7. Draw all structural formulas for all the isomers with molecular formula $C_2H_3Cl_3$. (2MKS)

8. Calculate the volume of 0.6M sulphuric (VI) acid solution needed to neutralize 30cm^3 of 0.2M potassium hydroxide. (2mks)

9. Use dot (.) and crosses (x) to show the bonding of the following compounds.

a) NH_3 (1MK)

b) NH_4^+ (1MK)

10. Analysis of a compound showed that it had the following composition: 69.42% carbon, 4.13% hydrogen and the rest oxygen. If the molecular formula of the compound (C=12, O=16, H=1) (3MKS)

11. A reference book states that the solubility of CuSO_4 in water at 15°C is $19\text{g}/100\text{g}$ of water. What is meant is meant by this statement. (1mk)
12. State two uses of hydrogen gas. (2mks)
13. Explain how a solid mixture of sulphure and potassium Chloride can be separated into solid sulphur and potassium chloride. (3mks)
14. Aqueous ammonia was added to a solution copper (ii) sulphate dropwise until in excess. State the observations made when
- a) A few drop of aqueous ammonia were added.(1mk)

 - b) Excess aqueous ammonia was added. (1mk)
15. By use of chemical equations distinguish the reaction of magnesium with water and magnesium with steam. (2mks)

16. The table below gives the number of electrons, protons and neutrons in substances X, Y, and Z.

Substance	Electrons	Protons	Neutrons
X	10	10	10
Y	10	8	10
Z	8	8	8

a) Which letter represents an ion? (1mk)

b) Which of the substances are isotopes? Give a reason. (2mks)

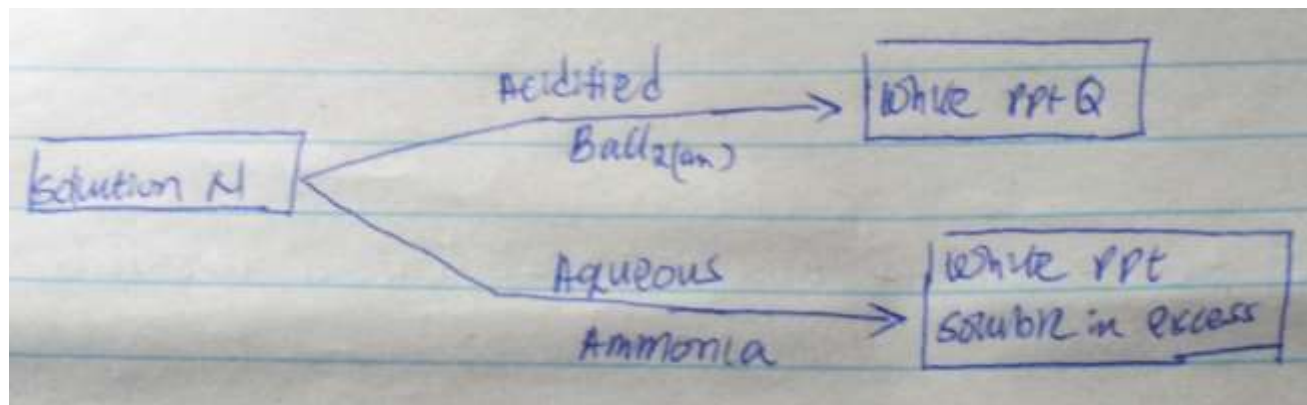
17. a) What is meant by the terms.

1) Element (1mk)

2) Atomic number (1mk)

(b) The formula for a chloride of titanium is $TiCl_3$. What is the formula of its sulphate?
(1mk)

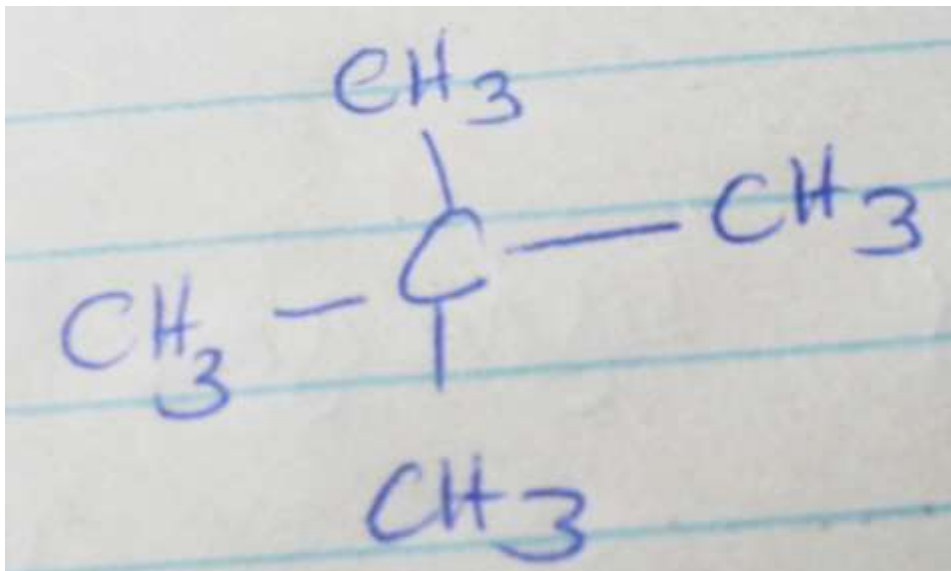
18. The chart below shows a scheme or reactions involving a sample of solution N. Study it and answer the questions that follow.



- 1) Identify the cation and the anion in solution N, (2mks)

 - 2) Write an ionic equation to show how Q is formed. (1mk)
19. Name the process
Solid carbon (IV) oxide (dry ice) changes directly into gas. (1mk)
20. When carbon (IV) oxide gas was passed through aqueous calcium hydrogen a white precipitate was formed.
- a) Write an equation for the reaction that took place. (1mk)

 - b) State and explain the changes that would occur when excess carbon (iv) oxide gas is bubbled through the white precipitate. (2mks)
21. Give the names of the following compounds



22. Explain why burning magnesium continues to burn in a gas jar full of sulphur (iv) oxide while a glowing splint would be extinguished. (3mks)
23. When hydrogen sulphide gas was bubbled into an aqueous solution of iron (iii) chloride a yellow precipitate was formed.
- State another observation that was made. (1mk)
 - Write an equation for the reaction that took place. (1mk)
 - What type of reaction was undergone by hydrogen sulphide gas in this reaction? (1mk)

24. A. What is allotropy (1mk)

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B. Name two allotropes of carbon. (2mk)

25. Ammonium sulphate is a fertilizer produced by passing ammonia gas into concentrated sulphuric acid. Calculate the mass in kg of sulphuric acid required to produce 25kg of the fertilizer. (S=32, O=16, N=14, H=1) (3mks)

26. The reaction between hot concentrated Sodium hydroxide and chlorine gas produces sodium chloride (v), sodium chlorate and water.

a. Write the equation for the reaction. (1mk)

b. Give one use of sodium chlorate (v). (1mk)

27. Explain why a solution of hydrogen chloride gas in methylbenzene does not conduct electricity but solution of a gas in water conduct electricity. (2mks)

28. Below is a sketch of a reaction profile. Study it and then answer the question that follows. State and explain the type of reaction represented by the profile. (2mks)

Reactants

Reaction path

29. I) what are amphoteric oxides? (1mk)

ii) Give a chemical formula example of an amphoteric oxide. (1mk)

30. Calcium oxide can be used to dry ammonium gas.

i. Explain why Calcium oxide is not used to dry hydrogen Chloride gas. (2mks)

ii. Name one drying agent of hydrogen chloride. (1mk)

31. When an organic compound Y is reacted aqueous Sodium carbonate it produces carbon (iv) Oxide. Y reacts within propanal to form a pleasant smelling compound whose formula is.

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i. Name and draw the structure formula of compound Y. (2mks)

ii. What is the name given to the group of compound to which Z belongs? (1mk)

32. Element X and Y have atomic numbers 20 and 8 respectively.

i. Write the electron arrangement of their ions. (2mks)

ii. Write the formula of the compound formed between X and Y. (1mk)

