Name:…… Index no:…….

233/1

CHEMISTRY

PAPER 1

(THEORY)

(2Hours)

1 a. State one reason why air is a mixture and not a compound. (1mk)

b. Brine is made by mixing water and common salt. Give the names of the following.

i. the Solute……(1mk)

ii. The Solvent……..(1mk)

iii. The Solution……(1mk)

2. State and explain the observation made when solid lead (ii) nitrate is heated in a test tube.(2mks)

3. An Oxide contains 59% sodium and the relative molecular mass of the oxide is 78%. What is the formula mass of the oxide. (Na=23.0, O=16.0)

4. The table below shows the tests carried out on three portions of a solution of a compound and the observations obtained. Study it and answer the questions that follows:

| Portion | tests | Observations |
|---|---|---|
| 1 | Addition of | No white participate |
| 2 | Addition of a few drops of lead (ii) nitrate | White participate formed |
| 3 | Addition of Aqueous Ammonia | Green participate formed |

a. Identify the

i. Anion present (1mk)

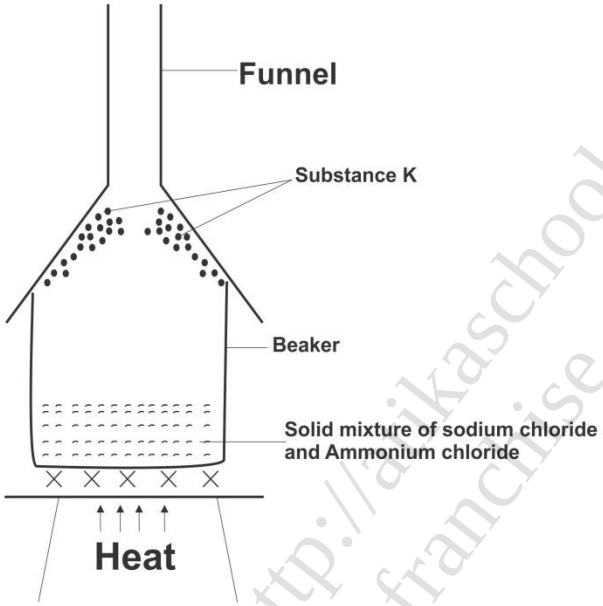
ii. Cation present (1mk)

b. What would happen if the products formed in experiment 2 is warmed. (1mk)

5. Consider the equilibrium below.

State the two ways in which the field of ammonia may be increased in the above process. (2mks)

6. The following set up shows the heating of a mixture of equal amount of sodium chloride and Ammonium chloride.




a. What is substance K? (1mk)

b. Name the process (1mk)

7. Starting with Barium Nitrate solution describe how a pure sample of Barium Carbonate can be prepared. (3mks)

8. Below is a representation of an electrochemical cell

a. What does // represent? (1mk)

b. Given the following

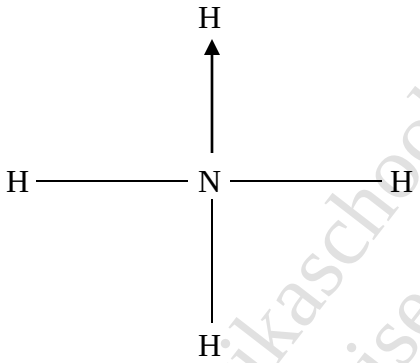
Calculate the e.m.f. of the electrochemical cell (2mks)

9. a. Using electrons in the outermost energy level, draw the dot (.) and cross (x) diagrams for the molecules of $H_2O$ and $C_2H_4$ (2mks)

i. $H_2O$

ii. $C_2H_4$

c. Ammonium ion has the following structure




On the structures label (2mks)

(i) Covalent bond

(ii) Co-ordinate bond

10. Explain why iron – aluminium alloy sheets would be preferred to iron-zinc alloy sheets for use in roofings. (2mks)

11. a. State Charles Law (1mk)

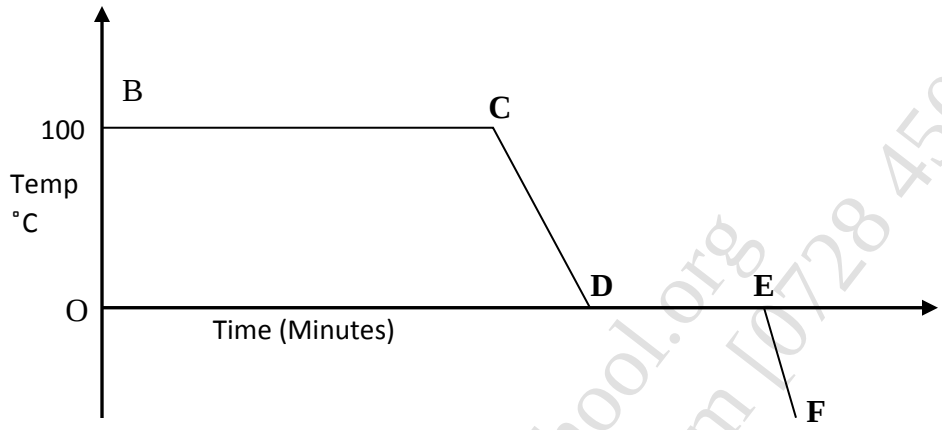
b. Volume of a certain gas Q was noted to be $480cm^3$ at $20^oc$. At what temperature would the volume be doubled? (2mks)

12. a. Define the term allotropy. (1mk)

b. Given two elements that show the phenomenon of allotropy and name any one of their respective allotrope. (2mks)

| Elements | Allotrope |
|---|---|
| (i) | |
| (ii) | |

13. The graph below is a cooling curve for water. Study it and answer the questions that follows.




a. Explain what happens to the water molecules in the region CD in terms of Kinetic theory (2mks)

b. In what state is the water in the region EF (1mk)

14. Give a reason why formula mass of $AlCl_3$ is sometimes267 instead of 133.5 (2mks)

15. The first step in Industrial Manufacture of Nitric (v) acid is the catalytic oxidation of ammonia.

a. what is the name of the catalyst used (1mk)

b. Write the equation for the catalytic oxidation of ammonia gas (1mk)

c. Nitric (v) acid is used to make ammonium nitrate. State two uses of ammonium nitrate. (1mk)

16. The table below gives the first ionization energy of four metals.

| Element | I | II | III | IV |
|---|---|---|---|---|
| Ionization energy KJ $^{mol-1}$ | 44 | 418 | 51 | 376 |

a. Define the term ionization energy (2mks)

b. Arrange the elements in order of increasing reaction. Explain. (2mks)

17. Candle wax consists of mainly two elements.

(a) Name the two elements (2mks)

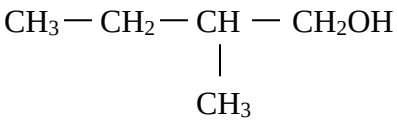
i. ……

ii……

(b) Name the products of burning candle wax in air. (1mk)

18. a. Draw the structural formula of the compound 2,2 –dimethyl propane (1mk)

b. Name the following organic compound (1mk)

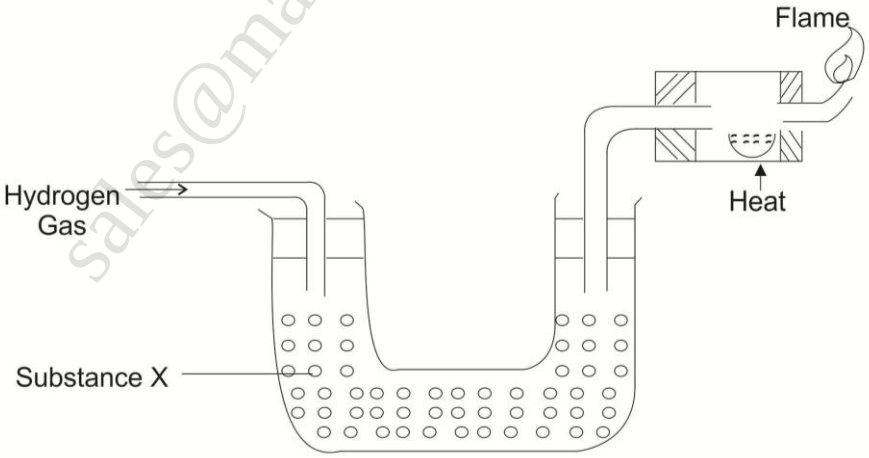


c. The use of CFC s has been linked to depletion of the Ozone layer.

i. What does CFC stands for? (1mk)

ii. Name the health problem associated with depletion of the Ozone layer to the human beings (1mk)

19. The set up below was used to investigate the reaction between the hydrogen gas and carbon (ii) oxide.



(a) Name substance X (1mk)

(b) State one observation in the combustion tube (1mk)

(c) Write an equation for the reaction taking place in the combustion tube (1mk)

(d) Xg of copper (ii) oxide were used and 2.5g of the solid was left after the reaction.

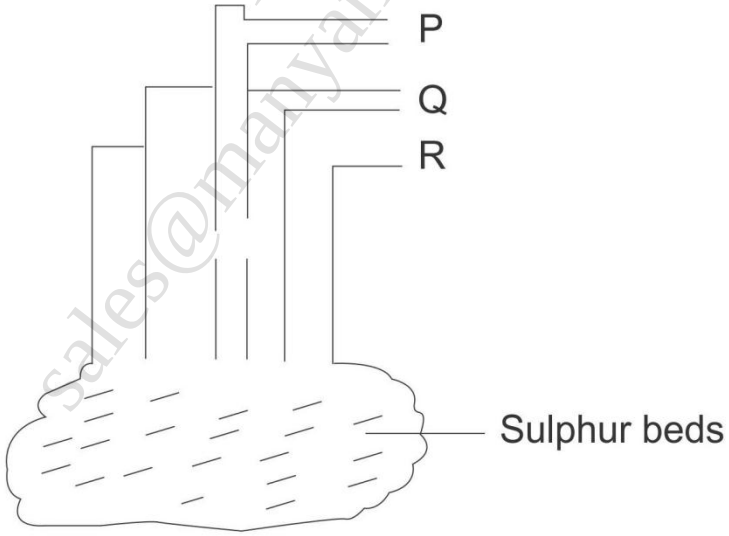
Determine the value of X.

(CU=64.0, H=1.0, O=16.0 (2mks)



20. The diagram below represents the extraction of Sulphur by Frasch process.

a. Name the substances that passes through tubes Q and R (1mk)



Tube Q……..

Tube R…….

b. What is the purpose of the substance that passes through tube P. (1mk)

c. How is bleaching effect of Sulphur (iv) oxide different from bleaching effect of chlorine gas. (2mks)

21. Study the information in the table below and answer the questions that follows.

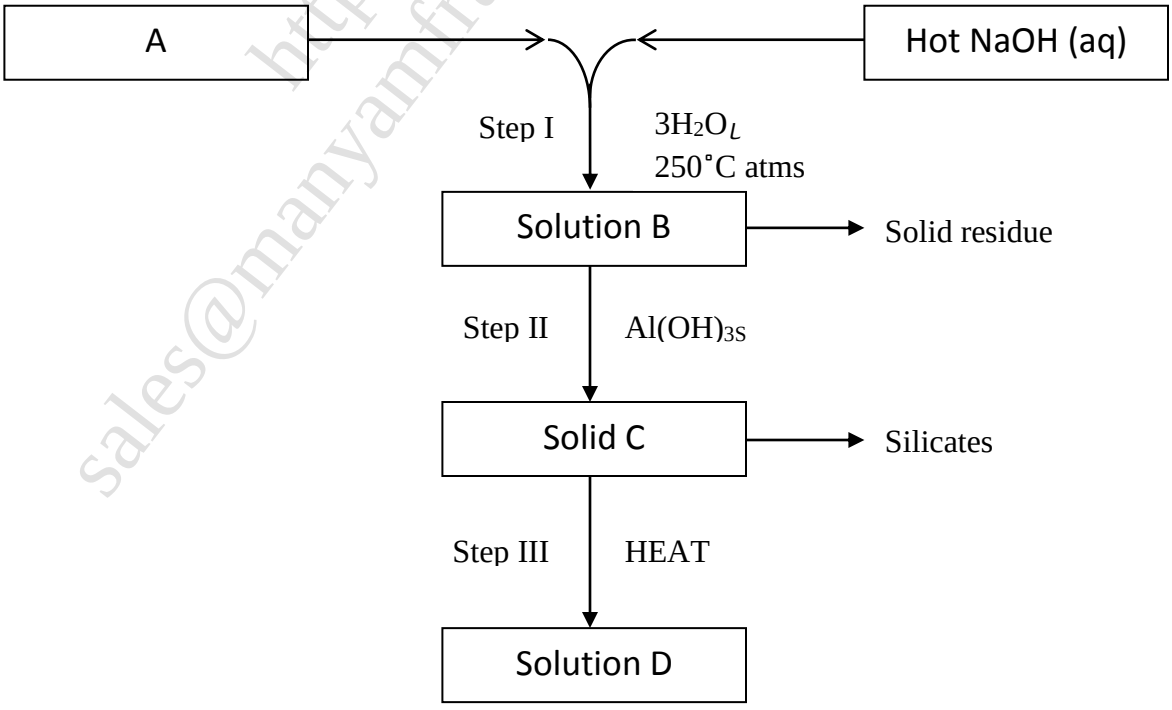
| Salt | Solubility g/100g of water | |
|---|---|---|
| | at $40^0$c | at $60^0$c |
| $ZnSO_4$ | 26 | 36 |
| $Pb(NO_3)Z$ | 78 | 98 |

A mixture containing 34g of $ZnSO_4$ and 72g of $Pb(NO_3)2$ in 100g of water at $60^0$c was cooled to $40^0$c.

a. Which salt crystallized out? Give a reason. (2mks)

b. Calculate the mass of the salt that crystallized out. (1mk)

22. The reaction scheme below is for the extraction of Aluminium. Study it then answer the questions that follow.



(a) Identify the compounds A and C. (1mk)

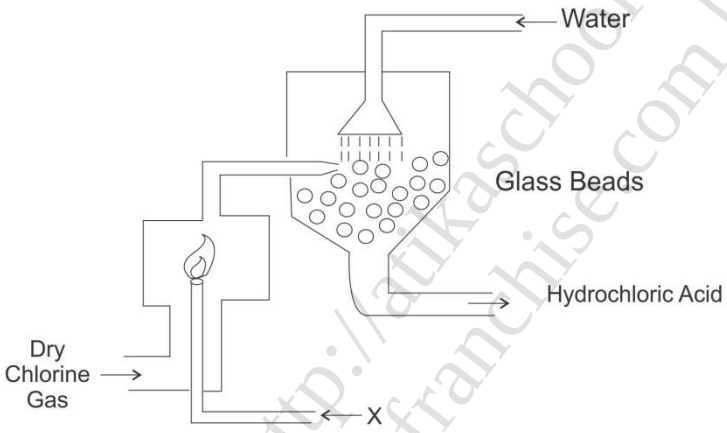
A-

C-

(b) Name the process in step II and explain why it is carried out. (2mks)

(c) Explain why the anode should be replaced regularly in the electrolysis of molten mixture of Aluminium Oxide and Cryolite (2mks)

23. The diagram below represents a setup for large scale manufacture of hydrochloric acid. Study it and answer the questions that follows.




(a) Name substance X (1mk)

(b)What is the purpose of the glass beads? (1mk)

(c) Give two uses of Hydrochloric acid (2mks)

24. Explain why vendors keep "dry ice" in their ice cream boxes. (1mk)

25. A student electroplated a knife with a copper metal.

a. Write an equation for the process that took place at the cathode. (1mk)

b. Calculate the time in minutes required to deposit 1.184g of copper if a current of 2 amperes was used. (1faraday=96500 coulombs) (CU=63.5) (2mks)

26. State one property that makes argon suitable for use in light bulbs. (1mk)

27. When a solution of Zinc salt is reacted with a few drops of ammonia white precipitates were formed. When excess ammonia is added the precipitates dissolves due to formation of a complexion which is soluble.

(a) Name the complex ion (1mk)

(b) Write the formula of the complex ion (1mk)