

Name.....

Index No.

School

233/1

CHEMISTRY

THEORY

Paper 1

Time: 2 Hours

BUSIA SUB-COUNTY JET 2016
Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES.

- Answer *all* the questions in the spaces provided
- Mathematical tables and Electronic calculators may be used.
- All working *must* be clearly shown where necessary

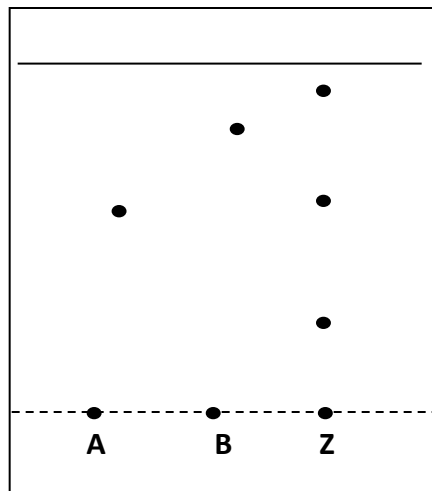
For Examiner's Use only

| Question | Maximum Score | Candidates Score |
|----------|---------------|------------------|
| 1 - 30 | 80 | |

This paper consists of 12 printed pages.

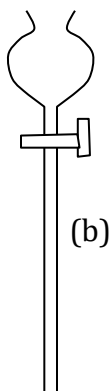
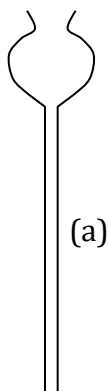
*Candidates should check the question paper to ensure that all pages are printed as indicated
and no questions are missing.*

- 1 Spot of pure pigments. A and B and a mixture Z were placed on a filter paper and allowed to dry. The paper was then dipped in a solvent. The results obtained were as on the paper.



- i) Which component of Z was more soluble and less absorbent (1mk)
-
- ii) Which of the pure pigments was not the component of Z (1mk)
-
- iii) Why is water not a suitable solvent for solvent extraction? (1mk)
-

- 2 Differentiate the apparatus below



(a) _____

(b) _____

- 3 A gas W diffuse through a small aperture at the rate of $1.5\text{cm}^3\text{sec}^{-1}$. Oxygen diffuses through the same aperture at a rate of $1.5\text{cm}^3\text{sec}^{-1}$. Calculate the molar mass of gas w. (3mks)

4 Two metals X and Y had the ionic electron arrangements as follows:

X^{2+} 2:8

Y^{3+} 2:8

a) Which of the two metals is a better conductor of electricity? Explain (1mk)

b) Compare the size of the atoms of the two metals? (1mk)

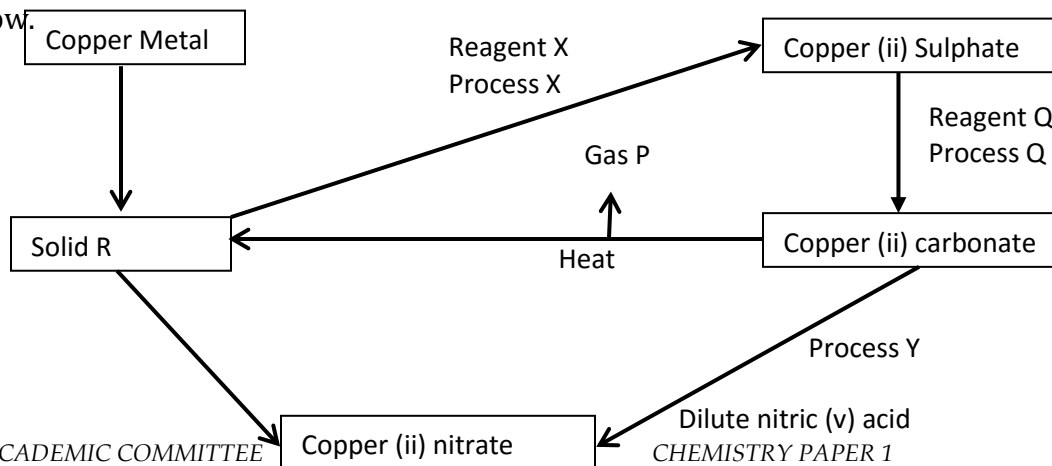
5 Determine the oxidation number of the atom in the bracket

a) $(NH_4)^+$ (N) (2mks)

b) Draw the electronic arrangement of the Nitrogen in (a) Above (1mk)

6 In terms of structure and bonding, explain why carbon (iv) oxide (CO_2) is a gas at room temperature while silicon (iv) oxide is a solid yet carbon and silicon belong to group (iv) of the periodic table (3mks)

7 The flow chart below shows a sequence of reactions starting with copper. Study it and answer the questions that follow.



a) Name reagent X and process X (1mk)

Reagent X _____
 Process X _____

b) Name reagent Q and process Q (1mk)

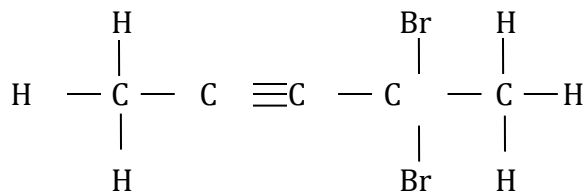
Reagent Q _____
 Process Q _____

c) Write an equation for production of gas P (1mk)

8 a) Name the following organic compounds

i) $\text{CH}_3\text{CH}(\text{Cl})_2$ _____ (1mk)

ii) _____ (1mk)



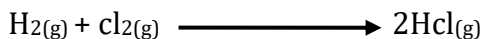
b) What type of reaction is represented by the equation below. (1mk)



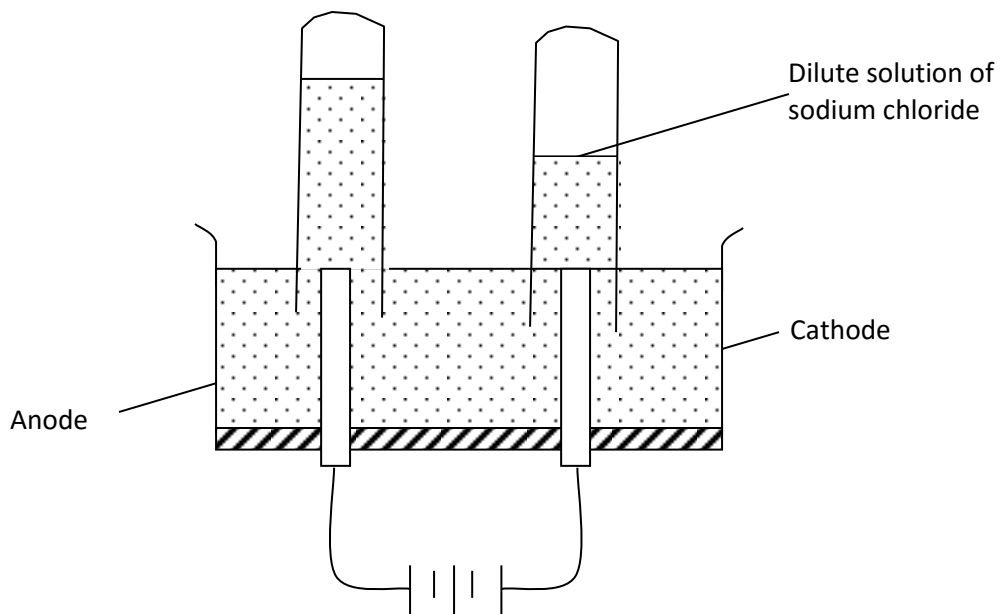
9 Given below are bond energies.

| Bond | energies in KJ/mol |
|-------|--------------------|
| H-H | + 436 |
| cl-cl | + 244 |
| H-cl | + 432 |

Use the above bond energies to determine whether the reaction below is exothermic or endothermic. (2 mks)



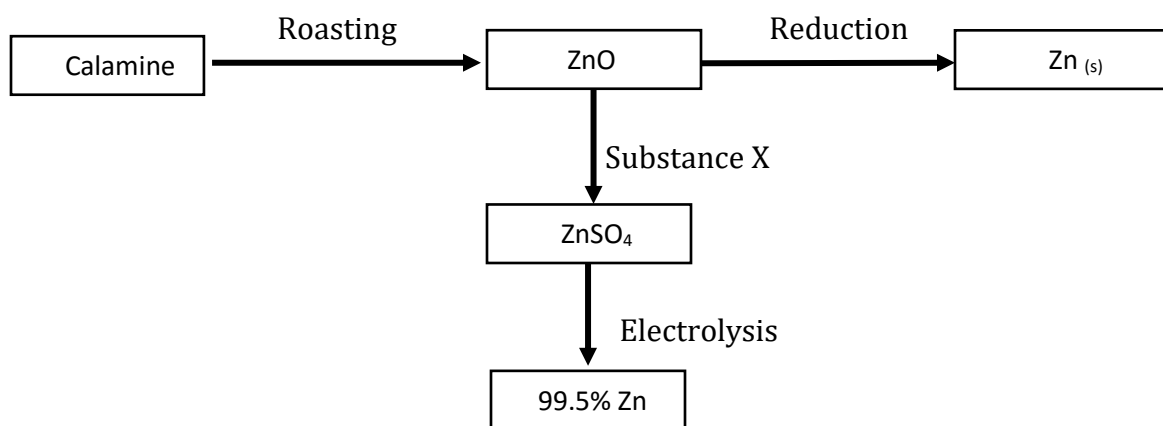
- 10 The electrolytic below was used to electrolyse dilute sodium chloride solution. Study it and answer the questions that follow.



- a) Account for the volumes in the test tubes (2mks)

- b) What will be the nature of the solution after the experiment (1mk)

- 11 Study the flow chart below and answers the questions that follow.

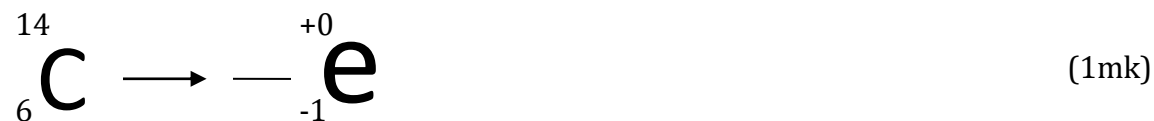


- a) Write the equation that produces the Zinc oxide (1mk)

b) Write an equation for the reduction of the zinc oxide. (1mk)

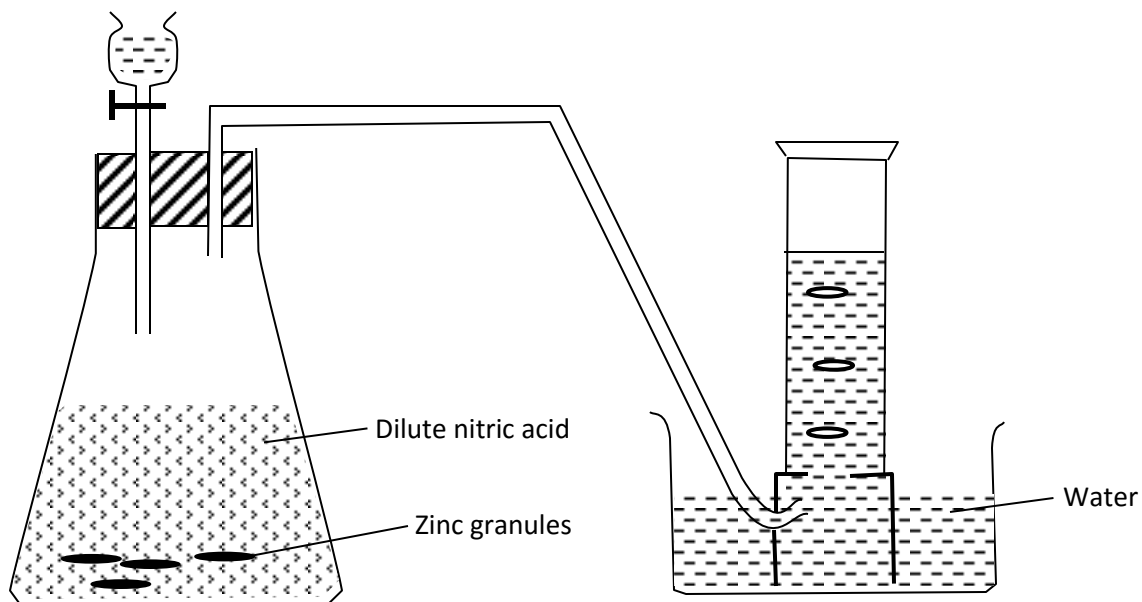
c) Name the substance X _____ (1mk)

12 a) Complete the radioactivity equation below



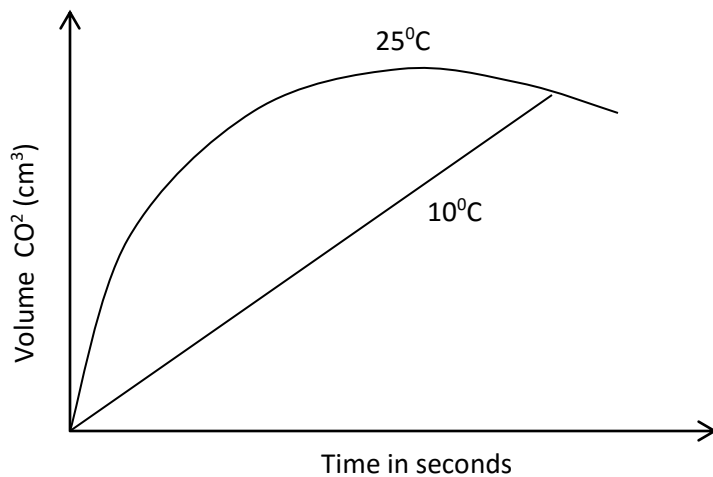
b) State **two** applications of the above equations (2mks)

13 A student set - up the apparatus below in an attempt to prepare hydrogen in the laboratory.



Explain why no hydrogen was produced (2mks)

- 14 The graphs below were obtained when same amount of marble chips was reacted with same volume of the same molarity hydrochloric acid of different temperatures.



In terms of the kinetic theory, explain the differences in the graphs.

(3mks)

- 15 What volume of hydrogen gas evolved when 40.0g of zinc is reacted excess dilute sulphuric acid at s. t. p (Zn = 65.4). (3mks)

- 16 Define the following terms

a) Binary electrolyte

(1mk)

b) Electrode

(1mk)

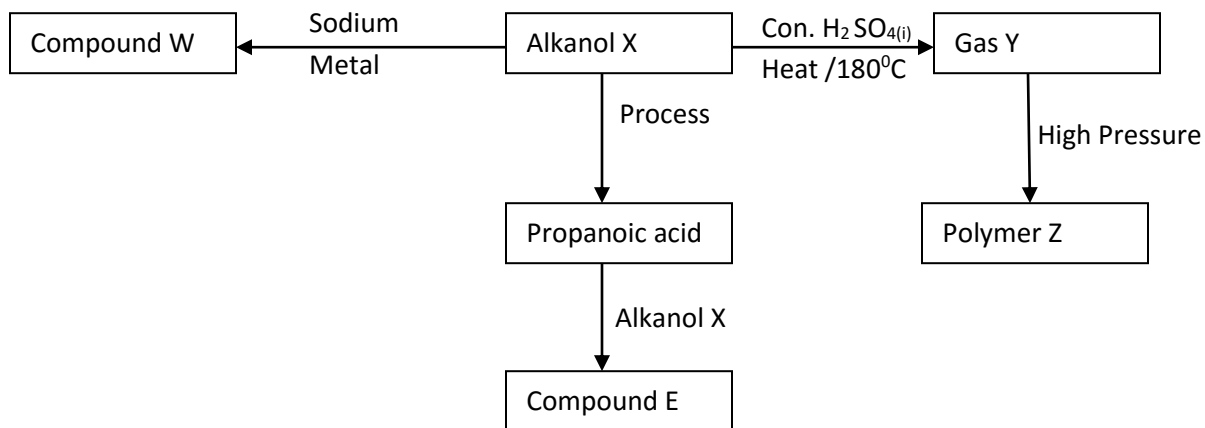
c) Give an example of inert electrode

(1mk)

17 a) Sulphur has two melting points 113°C and 119°C (1mk)

b) What is meant by scrubbing in relation to the contact process for the manufacture of sulphuric (vi) acid (1mk)

18 Study the flow chart below and answer the questions that follow



i) Draw and name compound E (1mk)

ii) State two uses of polymer Z (1mk)

iii) Write an equation for the production of compound W (1mk)

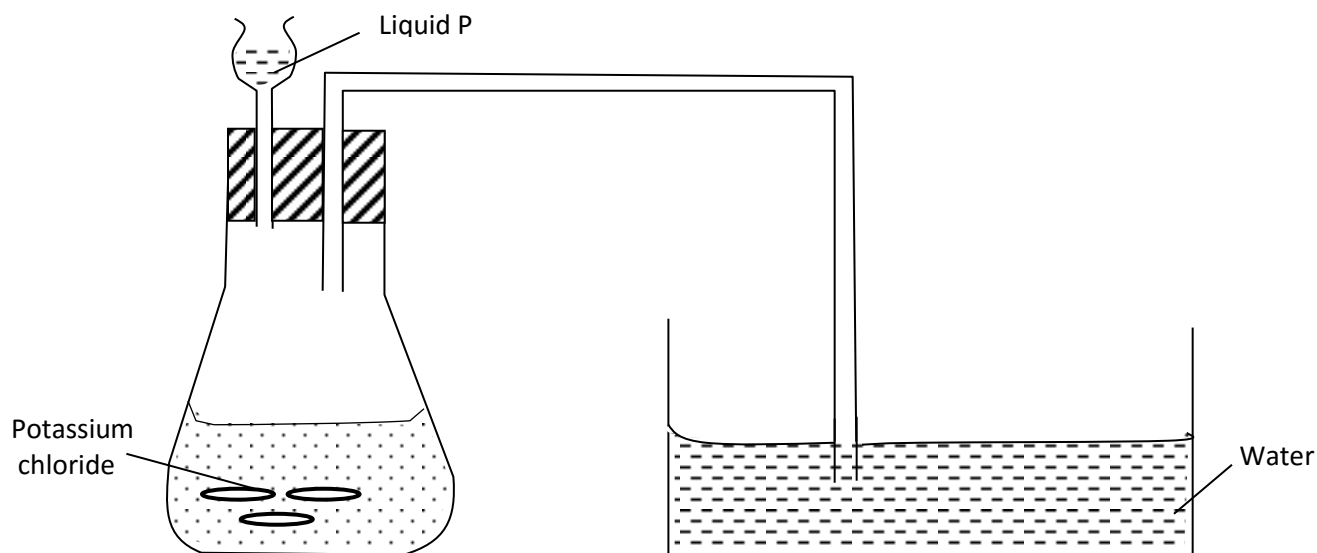
19 A saturated solution of oxalic acid at 30°C weighing 56g yields 20g of solid when evaporated to dryness. What is the solubility of the salt at 30°C. (3 mks)

20 In an experiment, the quantity of electricity passed to deposit 0.6g of metal Q from its salt, was 1930 coulombs ($Q = 120$, $F = 96\,500$).

i) How many Faradays of electricity are required to deposit 1 mole of Q (3mks)

ii) What is the charge of the ion of Q. Explain (1mk)

21 The apparatus shown below was used to prepare hydrochloric acid.



i) Identify **two** errors in the set - up. (1mk)

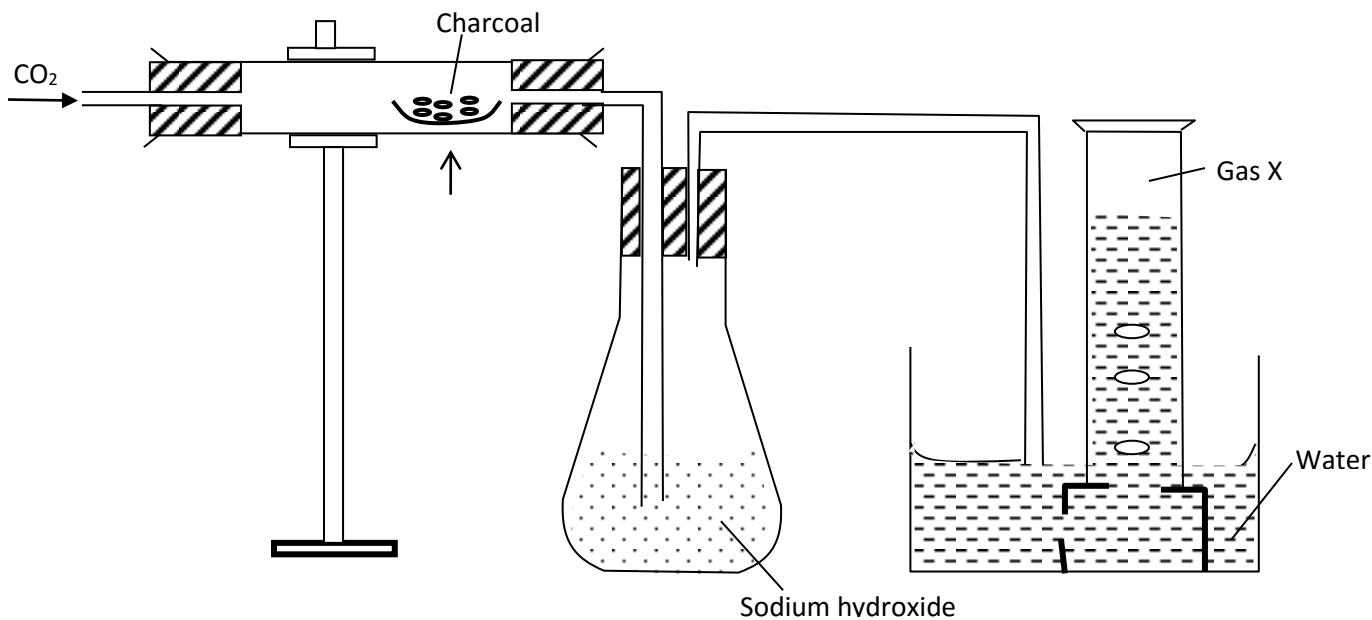
ii) What property of liquid P makes it possible for the reaction to take place (1mk)

iii) Write the equation for the reaction (1mk)

- 22 when 2g of ammonia nitrate is dissolved in 100m/s of dilute water, a temperature change of 1.5 k is noted. Calculate the molar enthalpy change of ammonia nitrate (density = 1gcm^3 , specific heat capacity 4.2KJ/kg/k , $N=14$, $H=1$, $O=16$) (3 mks)

- 23 State the Hess law (1mk)

- 24 The set - up below was used to prepare gas X. study it and answer the questions that follow:



- i) Why is Gas x termed as a silent killer (1 ½ mks)
-
- ii) Write the equation for the reaction in the conical flask (1mk)
-
- iii) Name gas X (½ mks)
-
- iv) Calculate the mass of one atom of magnesium metal ($Mg = 24$, $L = 6.0 \times 10^{23}$). (2mks)
-
-
-

25 Describe how hydrogen is used in the cutting of metals yet it is a gas (2mks)

26 i) State **two** conditions necessary for the formation of hydrated iron (iii) oxide (1mk)

(ii) State **two** disadvantages of formulation of hydrated iron (iii)oxide in structures (1mk)

(iii) State **two** ways of preventing corrosion of iron metal (1mks)

27 Flower extracts can be used as acid-base indicators however they are not the best. Explain (2mks)

28 The table below shows some element in part of the periodic table. Use it to answer the questions that follows:

| | | | | | | | | | |
|---|---|--|--|--|--|--|---|---|---|
| A | | | | | | | | | B |
| C | D | | | | | | E | E | G |
| | H | | | | | | I | J | |
| | K | | | | | | | | |

i) Which one is the most reactive non metal (1mks)

ii) Give two elements with the atomicity of one (1 ½ mks)

iii) What type of bond is formed between Hand J (½ mks)

29 Balance the nuclear equations below:

