

Name.....

Index No.....

School.....

Candidate's Signature.....

Date

233/1

CHEMISTRY

Paper 1 - Theory

July/August 2010

2 Hours

BUNGOMA JOINT EVALUATION TEST - 2010
Kenya Certificate of Secondary Education (K.C.S.E)

233/1

CHEMISTRY

Paper 1- Theory

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Instructions to candidates

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- Answer **all** questions in the spaces provided
- Mathematical tables and electronic calculators may be used for calculations
- **All** working must be clearly shown where necessary

FOR EXAMINER'S ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1-29	80	

This paper consists of 12 printed pages .Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing

1. Hydrogen has a very low density and it was once thought that this property would be of great importance in air transport. Explain why this idea has not lived to its expectation. (2mks)

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

2. An atom of an element X (atomic number 11) and an atom of element Y (atomic number 8) combine to form a compound.

a) Write is the formula of the compound (1mks)

.....
.....

b) State the type of bond present in the compound (1mk)

.....

c) Identify the type of structure formed (1mk)

.....

3. Dry chlorine gas was passed over heated iron resulting in solid P, solid P was dissolved in water resulting in the formation of a solution P. To a little of the solution P a few drops of sodium hydroxide were added and solid Q was obtained.

a) Name substances P and Q

P (½ mk)

Q (½ mk)

b) Write an equation to show how solid P was formed. (1mk)

.....

c) Name a suitable drying agent for chlorine gas (1mk)

.....

4. At high temperature ($C_{10}H_{16}$) burns spontaneously with a red flame in a gas jar at chlorine forming substances R and S.

a) Identify substances R and S

R (½ mk)

S (½ mk)

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

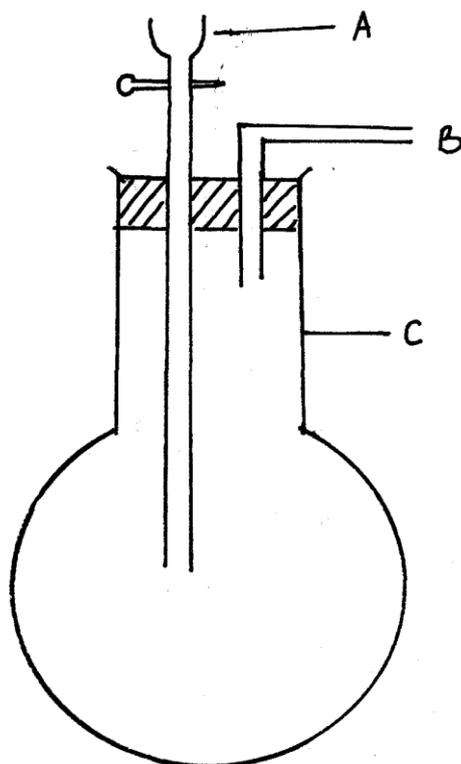
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5. A steel bar was to be electroplated with silver to improve its appearance and prevent Corrosion. Draw a sketch of a set up that could be used to electroplate the steel bar. (3mks)

6. A hydrocarbon contain 80% carbon by mass. Given that 1dm^3 of the compound has a mass of 1.35g. Determine the molecular formula or the compound (molecular volume at S.T.P = 22.4dm^3 , H = 1 C = 12) (3mks)

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.....
.....

7.



Identify apparatus A, B and C (3mks)

A

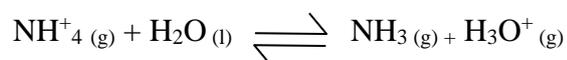
B

C

8. a) If air is bubbled through water, PH changes gradually from 7 – 5.7. Explain this Observation. (2mks)

.....
.....

- b) In the equation below, identify the reactant that act as an acid and explain how you would arrive at your choice. (1mk)



.....
.....

9. Neon has Isotopes $^{20}_{10}\text{Ne}$ and $^{22}_{10}\text{Ne}$ which exist in the ratio 9:1

- a) Determine its relative atomic mass of neon (2mks)

.....
.....

- b) Neon atoms have 10 electrons as do Fluoride (F^-) ion and Sodium ions (Na^+) ions why doesn't Fluoride and Sodium ions become neon when they are formed. (1mk)

.....
.....

10. Give the systematic names of the following hydrocarbons

- a) $\text{CH}_3 (\text{CH}_2)_4 \text{CH}_3$ (1mk)

.....

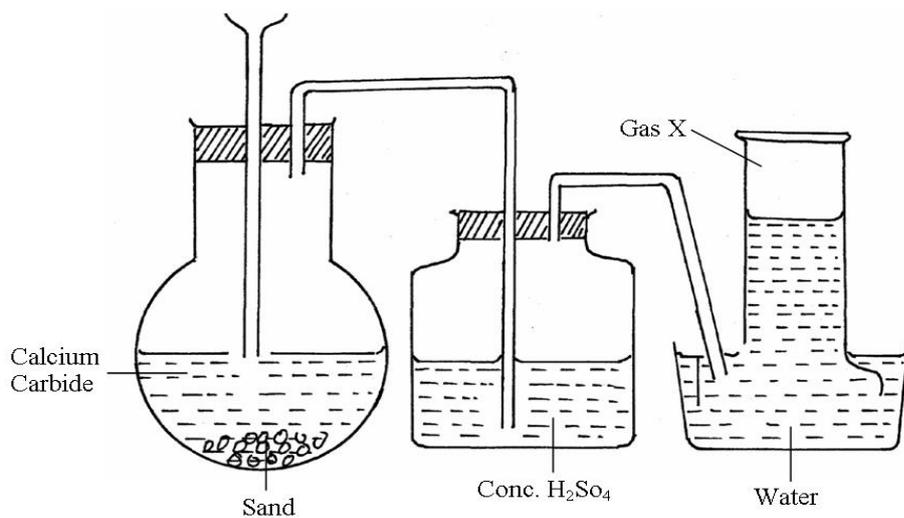
- b)
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 \text{C} = \text{CH}_2 \end{array}$$
 (1mk)

.....

- c) Draw the structural formula of 1, 1, 2, 2, tetra bromo ethane (1mk)

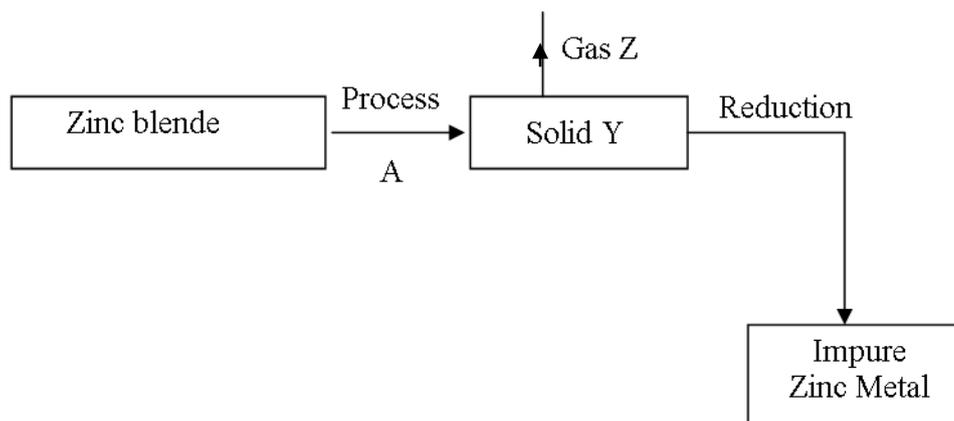
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11.



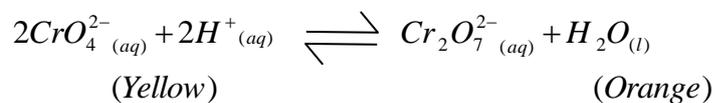
- Name gas X..... (1mk)
- Why is the gas X collected over water. (1mk)
.....
- Write an equation for the reaction that took place (1mk)
.....
.....

12. Study the flow chart below and use it to answer the questions that follow



- Identify process A (1mk)
- Write a balanced chemical equation for the reaction producing solid Y and gas Z (1mk)
.....
.....
- State how pure Zinc metal can be obtained from the impure Zinc metal above (1mk)
.....

13. In an experiment to establish an equilibrium between Chromate and dichromate ions is as shown below.



a) What would be observed when Sodium Hydroxide is added to the system (1mk)

.....

b) Explain your observation in (a) above (2mks)

.....

14. 6g of potassium nitrate solid were added to 120cm³ of water in a plastic beaker. The mixture was stirred gently and the following results were obtained.

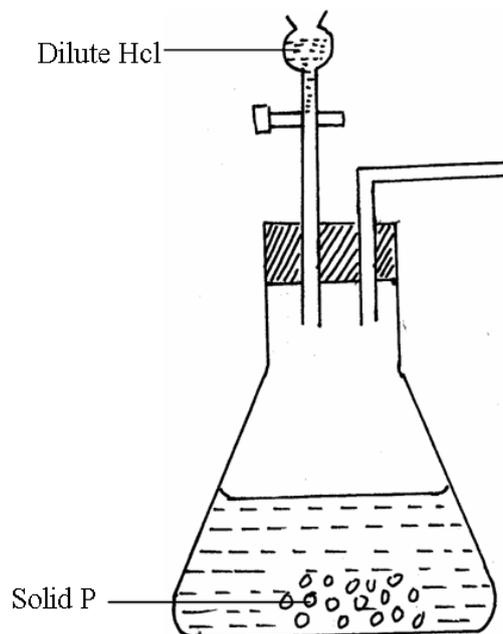
Initial temperature = 21.5^oC

Final temperature = 17.0^oC

a) Calculate the enthalpy change for the reaction (density = 1g/cm³, C = 4.2Jg⁻¹K⁻¹) (2mks)

b) Calculate the molar enthalpy change for the dissolution of potassium nitrate (1mk)
 (K = 39, N = 14, O = 16)

15. a) The diagram below is an incomplete set-up for preparation of hydrogen sulphide in the laboratory.



Complete the set-up (1mk)

b) Write the equation for preparation of the gas (1mk)

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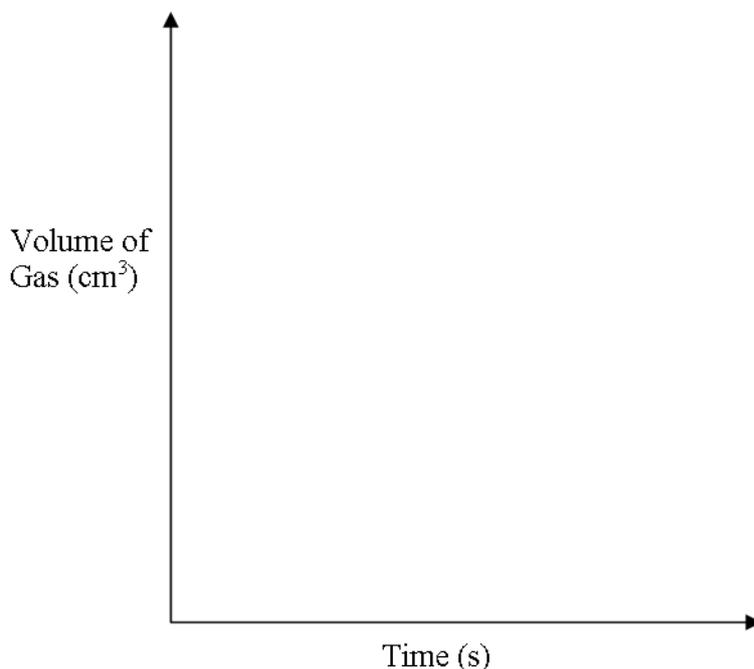
c) State the precaution that would be taken in preparation of the gas (1mk)

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16. The table below gives three experiment on reaction of excess dilute hydrochloric acid and 0.5g of calcium carbonate done under different conditions. In each case the volume of the gas was recorded at different time intervals.

Experiment	Form of CaCO ₃	Concentration of Hcl
I	Powder	0.8M
II	Powder	1.0M
III	Granules	0.8M

a) On the same axes sketch and label three curves that could be obtained from such results (2mks)



b) Why was excess acid used? (1mk)

17. X grammes of a radioactive isotope decayed to 12.5g in 100 days. The half-life of the isotope is 25 days.

a) What is meant by half-life (1mk)

b) Calculate the initial mass P of the radioactive isotope (2mks)

18. 40cm³ of chlorine gas and 60cm³ of hydrogen were mixed and exposed to sunlight.

a) Find the total volume of the resulting gas mixture. (2mks)

b) When the resulting mixture was shaken with sodium hydroxide solution the volume reduced. What is the volume of the residual gas? (1mk)

19. The fractional distillation of liquid air usually produces Nitrogen and Oxygen as major products.

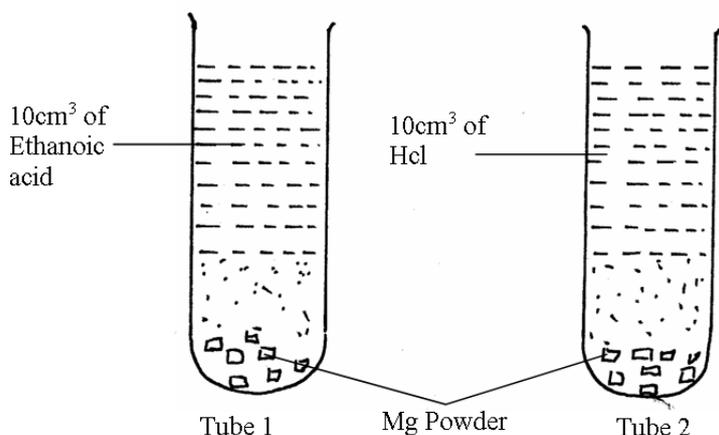
i) Write the equation for the reaction that takes place in order to remove carbon (IV) oxide from air before it is changed into liquid (2mks)

- ii) Describe how Nitrogen gas is obtained from air
 (B.Ps Nitrogen = -196°C Oxygen = -183°C) (2mks)

.....

20. Using a dot (●) and cross (x), draw a diagram to show how a coordinate bond is formed in an ammonium ion, NH_4^+ (N = 7, H = 1) (2mks)

21. In an experiment, equal amounts of magnesium powder were added into test tubes 1 and 2 as shown below.



Explain why the amount of hydrogen gas liberated in test tube 2 is greater than that in test Tube 1 after 5 minutes. (3mks)

.....

22. a) Describe how the following reagents can be used to prepare lead sulphate solid sodium Sulphates, solid lead carbonate, dilute nitric acid and distilled water (2mks)

.....

- b) Write ionic equation that produced lead sulphate in the above reactions (1mk)

23. Both methane (CH₄) and diamond have covalent bonds. Explain why methane is a gas whereas diamond is a solid at room temperature. (2mks)

24. Below is a list of electrode potential differences obtained when metals P, Q, R and T are used in the following electrochemical cells.

Metal(s) / metal (ions) // Copper (ions) / Copper solid.

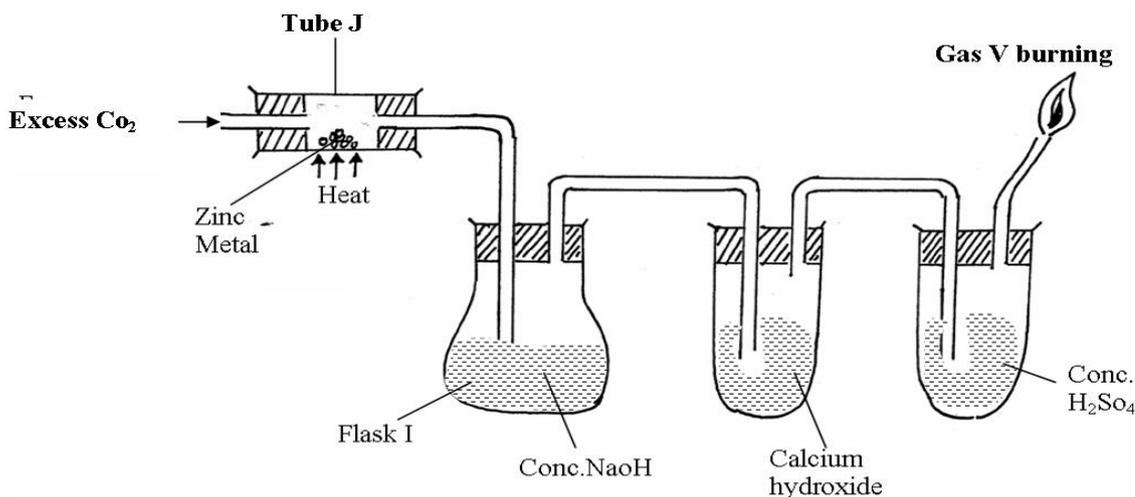
Metal	Potential differences (volts)
P	-1.10
Q	- 0.46
R	0.00
S	+0.45
T	+1.16

a) What is metal R? Explain (2mks)

b) Which two metals when connected would give the highest E^θ value of the cell.

Explain (1mk)

25. Study the diagram below and answer the questions that follow



a) State the changes that occur in tube J during and after the reaction in the experiment (1mk)

.....
.....

b) (i) Identify gas V (1mk)

.....

ii) Write a chemical equation to show the reaction that occur in tube J after the experiment. (1mk)

.....

26. The table below gives the solubilities of two salts X and V at different temperatures.

Salt	Solubility in g/100g of water at		
	20 ⁰ C	60 ⁰ C	80 ⁰ C
X	15	40	63
Y	34	40	44

a) A solution containing 30g of X in 100g water is cooled from 80⁰C to 20⁰C.

Calculate the mass of the salt formed

b) Given a mixture of equal masses of X and Y, Explain how you would obtain pure salt X

.....
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27. A student reacted hydrochloric acid with a mixture of iron fillings and Sulphur. A gas was evolved during the reaction.

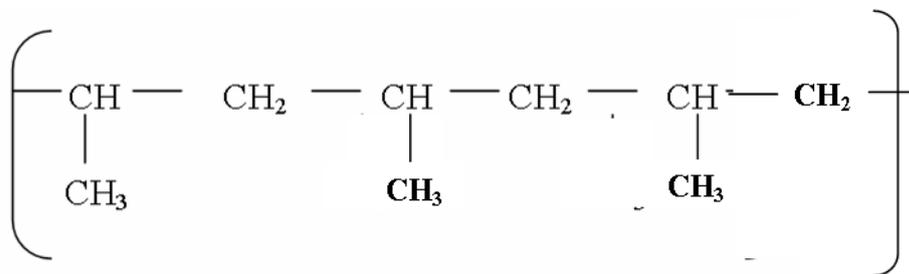
a) Identify the gas evolved (1mk)

.....

b) Write the equation for the reaction that evolved the gas (1mk)

.....

28. Consider the following sample of polymer



a) Draw and name the monomer

b) What name is given to this type of polymerization?

.....

c) A sample of the polymer has molecular formula 4200. How many monomers are in this sample? (C = 12, H = 1) (2mks)

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29. a) Give a reason why anhydrous calcium chloride is not used to dry ammonia gas (1mk)

.....

.....

b) Name one suitable drying agent for ammonia gas (1mk)

.....

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