

Name.....

Index No...../.....

School.....

Date

Candidate's Signature.....

233/1

CHEMISTRY

THEORY

PAPER 1

JULY / AUGUST 2010

Time: 2 Hours

BORABU – MASABA NORTH DISTRICTS JOINT EVALUATION TEST - 2010

Kenya Certificate of Secondary Education (K.C.S.E)

CHEMISTRY

(THEORY)

PAPER 1

JULY / AUGUST 2010

Time: 2 Hours

INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Answer **ALL** the questions in the spaces provided in the question paper
- Mathematical tables and silent electronic calculators may be used
- All workings **MUST** be clearly shown where necessary
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing

FOR EXAMINER'S USE 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 pages are printed as indicated and no questions are missing

1. An element N has the electron arrangement 2.8.6 and mass number of 32.

i) How many protons does element N have? (1mk)

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ii) What is the number of neutrons in the nucleus of N (1mk)

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iii) What type of bond would be formed between N and oxygen (1mk)

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2. Study the table below and use the information to answer the question that follows

Solid	Solubility in cold water	Solubility in hot water
A	Soluble	Soluble
B	Insoluble	Insoluble
C	Insoluble	Soluble

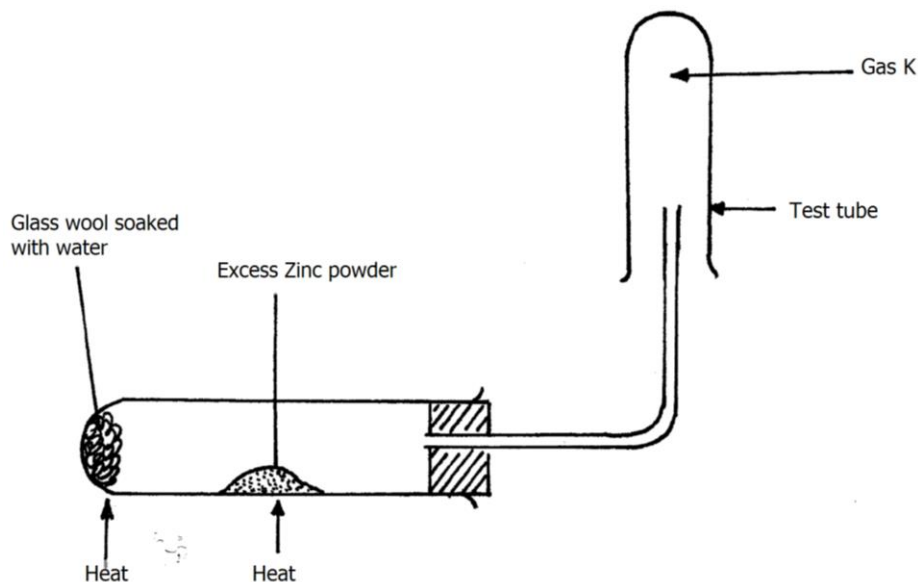
Describe how you would separate the solids from their mixture (3mks)

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3. Explain why the luminous flames of the Bunsen burner appear yellow (2mks)

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4. A student set up the experiment below to collect gas K. The glass wool was heated before heating the Zinc powder.



a) Why was it necessary to heat the moist glass wool before heating Zinc powder? (1mk)

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b) What would happen if the Zinc powder was heated before heating the glass wool? (1mk)

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c) What property of gas K makes it possible for it to be collected as shown in the diagram (1mk)

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5. 2.12 grams of anhydrous sodium carbonate are dissolved in 200.0cm³ water. 25.0cm³ of this solution neutralize 80.0cm³ of hydrochloric acid solution. Calculate the concentration of hydrochloric acid (in mol/dm³) (3mks)

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6. Explain the observation made when chlorine gas is bubbled through a solution of potassium Bromide (2mks)

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7. In the reaction between lead (II) carbonate and dilute sulphuric (VI) acid, very little carbon (IV) oxide gas is evolved, but with dilute nitric (V) acid a lot of carbon (IV) oxide gas is evolved. Explain this observation. (2mks)

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8. In an experiment, acidified potassium chromate (VI) solution was added dropwise to a Solution of ethanol in a test tube till in excess.

a) Name the main product formed in the reaction (1mk)

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b) State and explain the observation made. (1mk)

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c) Write a balanced equation for the reaction (1mk)

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9. Some average bond energies are given below

Bond	Energy in kJ mol ⁻¹
C – C	348
C – H	414
Cl – Cl	243
C – Cl	432
H – Cl	340

Calculate the energy change for the reaction below



10. Twenty eight grams of a saturated solution of a salt and water at 25⁰C yielded 7g of a solid When evaporated to dryness. Find the solubility of the salt at 25⁰C. (2mks)

11. What property of sodium element makes it suitable as a coolant in nuclear reactors (1mk)

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12. In temperate countries, salt is sprayed on roads to defrost and clear roads but the long term effect of this practice is costly to motorists.

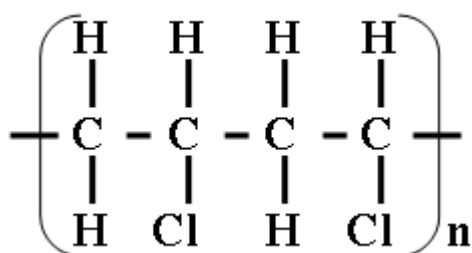
a) Explain the role of salt in defrosting the ice (2mks)

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b) Explain why the long term effect is costly to motorists (2mks)

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13. The structure below shows a common polymer



n is a very large number

a) Give the name of the polymer (1mk)

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b) Give the structure of the monomer from which the polymer is derived and name it (1mk)

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c) Name the polymerization process that gives the polymer (1mk)

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14. Carbon (IV) oxide is a green house gas. It is given a green house factor of 1. Other gases are given a green house factor that compares their effect with carbon (IV) oxide. The green house effect increases as the factor value increases. The table below gives some information about four different gases.

Gas	Green house factor	Percentage of the gas in the atmosphere
CO ₂	1	0.036
CH ₄	30	0.0017
N ₂ O	160	3.0 x 10 ⁻⁴
CCl ₃ F	21000	2.8 x 10 ⁻⁸

- a) State one possible consequence of an increased green house effect (1mk)

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- b) Give one source of methane (1mk)

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- c) Why is an increase in percentage of methane more worrying than the same percentage increase of carbon (IV) oxide? (1mk)

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- d) What other environmental problems beside its action as a green house gas is caused by CCl₃F? (1mk)

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15. M grammes of a radio-active isotope decayed to 5 grammes in 100 days. The half-life of the isotope is 25 days.

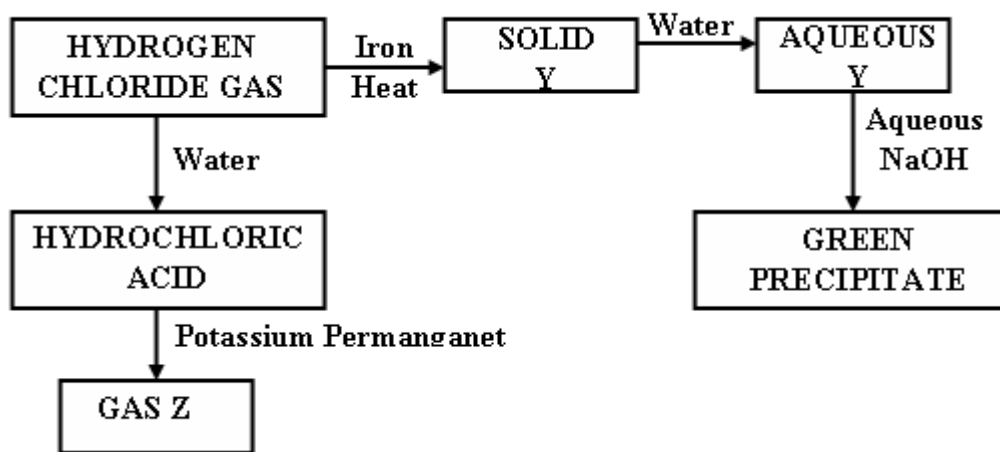
- a) What is meant by half-life (1mk)

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

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16. Study the flow chart below and answer the questions that follow.

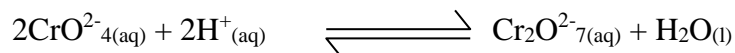


- a) Name substances Y and Z
- i) Y..... Z..... (2mks)
- b) Write an equation for the formation of the green precipitate (1mk)

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17. An equilibrium exist between the chromate ions, $\text{CrO}_4^{2-}(\text{aq})$ and dichromate ions, $\text{Cr}_2\text{O}_7^{2-}(\text{aq})$ as represented by the equation below.



What effect would addition of aqueous potassium hydroxide have on the equilibrium (2mks)

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18. It takes 10 minutes for 1.6cm^3 of gas X to diffuse through a small hole. Under the same Conditions of temperature and pressure, it takes the same time for 148cm^3 of oxygen to diffuse through the same hole. Calculate the relative formula mass of X (O = 16) (3mks)

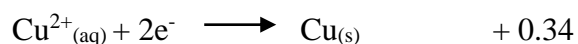
19. A current of 1A was passed through a solution of silver nitrate for 30 minutes. Calculate the Mass of silver metal deposited at the cathode ($Ag = 108$, $IF = 96500^0C$) (3mks)

20. Complete the table below by selecting the appropriate PH for each substance from PH values 1.0, 4.0, 7.0 and 10.0

Substance	PH value
Sodium Carbonate	
Lemon Juice	(2mks)

21. Use the following half-cell standard electrode potentials to answer the questions that follow.

Half – cell reaction E^{θ} (Volts)



- a) Select two half – cells which will combine to give a minimum e.m.f. (1mk)

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- b) Calculate e.m.f of the cell in (a) above (2mks)

22. Passing a small quantity of carbon (IV) oxide through lime water, forms a white precipitate which dissolves when excess carbon (IV) oxide is bubbled through.
- a) Name the white precipitate (1mk)
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- b) Why does the white precipitate disappear with excess carbon (IV) oxide (1mk)
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- c) What will happen when solution in (b) above is boiled? (1mk)
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23. When magnesium powder was added to 100cm³ of 0.5M iron (II) sulphate solution, the pale green colour of the solution faded and the temperature changed from 19.5⁰C to 25.5⁰C. Calculate the molar enthalpy for the reaction. (Specific heat capacity = 4.2Jk⁻¹kg⁻¹ density of the solution = 1.0gcm⁻³) (3mks)

24. The empirical formula of a hydrocarbon is C₂H₃. It has a relative molecular mass of 54. (H = 1.0; C = 12.0)
- a) Determine the molecular formula of the hydrocarbon (1mk)
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b) Draw the structural formula of the hydrocarbon (1mk)

c) To which homologous series does the hydrocarbon drawn in b) above belong (1mk)

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25. The boiling points of three hydrides are given below

Hydride	RMM	Boiling Point °C
Methane	16	91.1
Ammonia	17	240
Water	18	373

Explain why these three hydrides have very different boiling points (3mks)

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26. Explain using equations the difference between bleaching by chlorine and bleaching by Sulphur (IV) oxide gases. (3mks)

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27. In an experiment a small amount of charcoal was put into a test tube and 5cm³ of concentrated Nitric (V) acid added.

a) State the observation that was made (1mk)

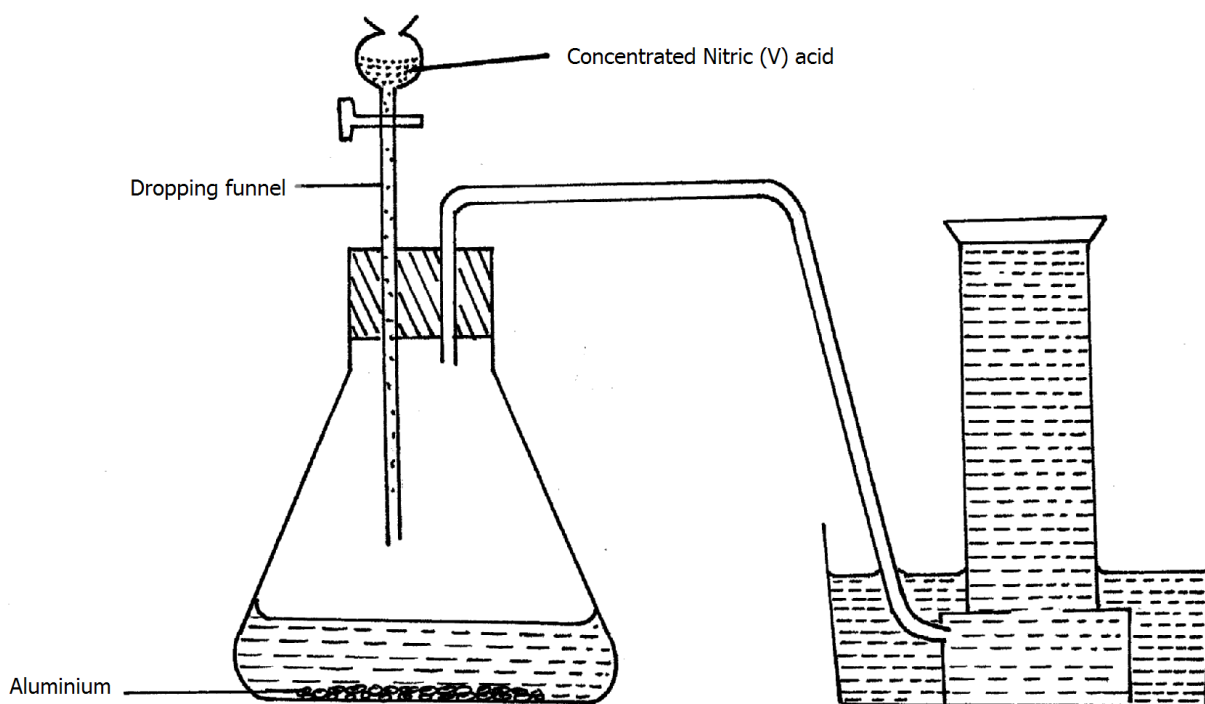
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b) Explain the observation made (2mks)

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28. Determine the PH of 20cm³ of a solution containing 0.005 moles of sodium hydroxide (3mks)

29. In order to prepare hydrogen gas in the laboratory a student set up the apparatus shown in the diagram below. Study it and answer the questions that follow.



a) Suggest why the student collected no gas (1mk)

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b) In a separate experiment the student reacted iron and hydrochloric acid to prepare hydrogen gas.

i) Write an ionic equation for the reaction (1mk)

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ii) The hydrogen gas produced was found to have a foul smell. Suggest an explanation for this (1mk)

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