KAKAMEGA CENTRAL SUB COUNTY JOINT EVALUATION EXASM
CHEMISTRY PAPER 1

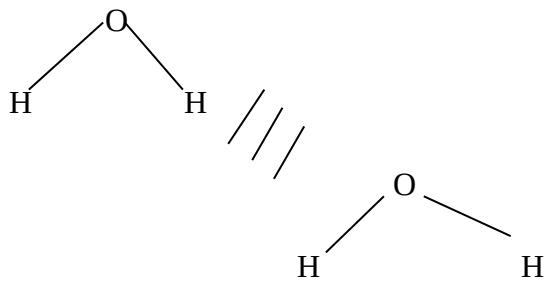
MARKING SCHEME

2015

1. Molecule: !HCl and HCl
   MM. of !HCL = 38
   Of $^{2}_{1}$ HCl = 39

2. (a) B. has completely filled outer energy level.
   (b) (i) A and C
   (ii) CA reject AC (3mks)

3. (a)hydrogen bond is formed between a hydrogen atom of one molecule with a more electronegative element of another molecule. (accept illustration e.g



(3MKS)

Covalent bond is formed when two electronegative elements bond by each donating an electron to be shared in the bond. (3mks)

(b)ethanol has hydrogen bonding in addition to vanderwaals forces which makes the intermolecular force strong requiring more energy, while hexane has only weak vander waals forces.

4. 115.65g of

(2 mks)

b) Ethanol has hydrogen bonding in addition to vander waals forces which makes the intermolecular force strong requiring more energy, while hexane has only weak vander waals forces.

4. 115.65 of saturated solution contain 15.65 g of $FeSO_4$. 45 g of saturated solution will contain

$$\frac{45 \times 15.65}{115.65}$$

$= 6.0895g$ (2mks)

5. Reacting mole ratio $CaCO_3$: HCl = 1:2

Moles of HCl = 0.2moles

Moles of $CaCO_3$ require = 0.2 x ½ = 0.1 moles

M.M of $CaCO_3$ = 40 + 12+48 = 100

Moles of $CaCO_3$ is 15g = 15/ 100 = 0.15moles

No of moles in excess = 0.15 – 0.1 = 0.05

Mass in excess = 0.05 x 100

= 5g of $CaCo_3$ (3mks)

6. (a) Molecula mass = $(C_3H_6O)n = 116$

$(12 \times 3 + 6 \times 1 + 16)n = 116$

$(42+16)n = 116$

$58n = 116$

$N = 116/58$

$N = 2$

M.F. is $C_6H_{12}O_2$ (2mks)

b) %age of C $= \frac{12x6}{116} \times 100$

$= \frac{72}{116} \times 100$

= 62.069% (1mk)

= 62.07%

7. a) i) - Bromoprop-1-ene

ii) But-1-yne

b) The brown colour of bromine watr decolourises (3mks)

8. a) G- Ammonia

b) Filtration

c) $_2NaHCO_{3(s)} \longrightarrow Na_2CO_{3(s)} + CO_2 + H_2O_{(l)}$ (3mks) Penalise for wrong or missing symbols /2mk

9. Magnesium has 2 valence electrons delocalized in its structure compared to sodium which has only 1 (2mks)

10. a) Isotopes

b)

c) EO_2 (3mks)

11. a) Covalent bond and dative bond / dative covalent/ coordinate

b) 14 electrodes

c) Nitrogen in ammonia has a lone pair of electrons which it shares with the empty sub energy level f Boron to enable it have 8 electrons (3mks)

12 i) M

ii) M

iii) L (3mks)

13. Working diagram (3mks)

Label paraffin upper layer

Water lower layer

14. i) Boiling point is arrange not specific temperature

ii) Determine the fraction by fractional distillation (2mks)

15. a)

Solution	Phenolphthalein	Indicator N
Distilled water		
Ammonium hydroxide	Pink	
Hydrochloric acid	Colourless	

(2mks)

b) Universal indicator

16. $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_1}$

$V_2 = \frac{P_1V_1T_2}{T_1P_2}$

= 100648.5 x 0.3 x 283 (substitution) (2mks)

$= \frac{303 \times 101\ 325}{303 \times 101325}$

V_2 = 0.2783dm3

17. a) $T_{(S)} + X^{2+}_{(aq)} \longrightarrow T^{2+}_{(aq)} + X_{(s)}$ (3mks) (Penalise for missing or wrong state symbols ½)

18. a) $MgSO_{4(aq)} + Na_2CO_{3(aq)} \longrightarrow MgCO_{3(s)} + NaSO_{4(aq)}$

$CaCl_2 + Na_2CO_3$

b) Sodium Carbonate.
Ammonia Solution.

19.(i) water level in the gas jar will rise

Size of phosphorus will reduce

Water level in the trough will reduce

White fumes as phosphorus smouldes. (any two correct ½ mk each) (3mks)

(ii) $P_4 + 5O_{2(g)}$

(iii) Magnesium react with both oxygen and nitrogen. Hence greater reduction in volume.

20. (a) endothermic reaction is where heat energy is absorbed from the environment resulting in fall in temperature. (1mk)

Exortermic reaction is where heat energy is evolved to the environment resulting in rise in temperature

(b) $CH_{4\,(g)}\ 2O_{2(g)} \longrightarrow CO_{2(g)} + 2H_2O_{(l)}$

Bonds broken 4-H Bond formed

2 0=0 2 C =0

4 H -0

DH = (4x413+2x497) – (2x 804 + 4x46)

(1652 + 994) – (1608 + 1856)

= - 118KJ/mol

21.(a) The dry wood turned black and bubbles of colourless gas produced . conc. Sulphuric acid dehydrated to wood. (1mk)

(b) Acidified $K_2Cr_2O_{4(aq)}$ changed from orange to green. Conc. H_2SO_4 acid is reduced to $SO_{2(g)}$ which reduced $K_2Cr_2O_4$/ to green Chromate (III) Sulphate. (2mks)

22. (a) The black mass turned red/red brown

(b) $CuO_{(s)} + C_{(s)} \rightarrow Cu_{(s)} + CO_{(g)}$

(c) Fuel/Reducing agent in extraction of metals. (3mks)

23. (a)water

(b)$2C_2H_{6(g)} + 7O_{2(g)} \rightarrow 4CO_{2(g)} + 6H_2O_{(l)}$

c) Some $CO_{2(g)}$ produced dissolved in it making it weakly acidic with pH below (3mks)

24. $Na_2CO(s)\ 2HCl(aq) \longrightarrow 2NaCl(aq) + CO_2(g) + H_2O(l)$

RFM of $NaCO_3$ = 2 x 23 +12 +48 = 106

Moles of $NaCO_3$ = 5.3 / 106 = 0.05moles

Reacting mole ratio 1:2

:- Moles of HCl = 0.05 x 2 = 0.10 moles

Volume of HCl = 0.1 x1000

0.5

= 200cm^3 of HCl (3mks)

25. a) To allow for steady flow of ammonia gas to be liberated

b) Yellow flame

c) $4NH_{3(g)} + 5O_{2(g)} \longrightarrow 4NO(g) + 6H_2O(l)$ (3mks)

26. a) Halogens

b) x and Y

c) $3Z_{2(l)} + 2Fe_{(s)} \longrightarrow 2FeZ_{3\,(s)}$ or

$3Br_{2(l)} + 2Fe_{(s)} \longrightarrow 2FeBr_{3(s)}$ (3mks)

27. a) R – Hydrogen

b) Product Iron(II) Chloride

Equation $Fe_{(s)} + 2HCl_{(g)} \longrightarrow FeCl_{2(s)} + H_{2(g)}$ (3mks)

28. a) Sulphur

b) To strengthen it / make it tough (2mks)

29. a) Existence of an element in more than one form under same condition

b) Sulphur, carbor, phosphorus any two correct (3mks)

NAME…… …….. INDEX NO:……..……

CANDIDATE'S SIGNATURE……..……

DATE: ……..……

233/3
CHEMISTRY
PAPER 3
PRACTICAL
JULY/AUGUST-2015
TIME: 2 ¼ HOURS

KAKAMEGA CENTRAL SUB-COUNTY JOINT EVALUATION EXAM-2015

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

233/3
CHEMISTRY
PAPER 3
PRACTICAL
JULY/AUGUST-2015
TIME: 2 ¼ HOURS

INSTRUCTIONS TO CANDIDATES

- Write your **name** and **index number** in the spaces provided.
- **Sign** and write the **date** of examination in the spaces provided.
- Answer ***all*** the questions in the spaces provided in the question paper.
- You are not allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus you need.
- All working **must** be clearly shown where necessary.
- Mathematical tables and electronic calculators may be used.

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	12	
2	7	
3	21	
TOTAL	40	

This paper consists of 5 printed pages.
Candidates should check the question paper to ascertain all the pages are printed as indicated And no questions are missing.

1. ***You are provided with:***

- 2M hydrochloric acid, solution **R**
- 0.4M sodium hydroxide, solution **Q**
- 1.06g of anhydrous carbonate, $\mathbf{X_2CO_3}$, solid **A**
- Phenolphthalein indicator

You are required to determine the atomic mass of **X** in $\mathbf{X_2CO_3}$

PROCEDURE

Using a clean measuring cylinder, place 50cm^3 of solution **R**, and transfer it into the plastic beaker provided. Add all the solid **A** provided at once, swirl until effervescence stops.

Transfer this solution into a 250cm^3 volumetric flask and add distilled water up to the mark and shake well. Label this as solution **B**. fill the burette with solution **Q**.

Using a pipette and a pipette filler, place 25cm^3 of solution B and place it into a conical flask, add 2 drops of phenolphthalein and titrate B against Q. UNTIL THE FIRST PERMANENT PINK COLOUR IS OBTAINED. Record your results in the table below. Repeat the titration two more times and complete the table.

TABLE

	I	II	III
Final burette reading (cm^3)			
Initial burette reading(cm^3)			
Volume of solution Q used (cm^3)			

(4mks)

a) Calculate the:

i) Average volume of solution **Q** used (1mk)

……

……

ii) Number of moles of hydrochloric acid in 25cm^3 of solution **B** (3mks)

……

……

……

iii) Number of moles of hydrochloric acid in $250cm^2$ of solution **B** (2mks)

……

……

……

iv) Number of moles of hydrochloric acid $50cm^3$ of solution **R** (1 mk)

……

……

……

v) Number of moles of hydrochloric acid that reacted with carbonate, Solid **A**. (1mk)

……

……

……

vi) Number of moles of carbonate that reacted with $50cm^3$ of solution **R** (1mk)

……

……

……

vii) Atomic mass of X in one mole of X_2CO_3 (C=12, O=16) (2mk)

……

……

Q. 2. You are provided with solid Z, carry out the tests and record your observations and inferences in the spaces provided.

a) Place a spatula of solid in a clean dry test tube. Heat the solid gently and then strongly test for any gases produced using red and blue litmus papers.

Observations	Inferences
(2mks)	(2mks)

b) place the remaining of solid into a boiling tube and add 15cm3 of distilled water and shake well. Divide the solution into five portions each of $2cm^3$ and place into four test tubes.

Observations	Inferences

(2mks)	(2mks)

(i) To the first portion, add sodium hydroxide dropwise until in excess.

Observations	Inferences
(1mks)	(1mk)

i) To the second portion, add ammonia solution dropwise until in excess.

Observations	Inferences
(1mk)	(1mk)

ii) To the third portion, add $2cm^3$ of sodium chloride solution

Observations	Inferences
(1mk)	(1mk)

iii) To the 3rd portion , add 1cm3 of barium chloride solution, followed by 2cm3 of hydrochloric , solution R

Observations	Inferences
(1mk)	(1mk)

iv) To the forth portion, add $2cm^3$ of lead (ii) nitrate solution

Q3. You are provided with liquid K, carry out the following tests and record your observations and inferences in the spaces provided.

a) Using a teat dropper, place 5 drops of the liquid on clean dry water glass and ignite

Observations	Inferences

(1mk)	(1mk)

b) Place about 1cm^3 of K in a test tube and add an equal amount of distilled water, shake the mixture.

Observations	Inferences
(1mk)	(1mk)

c) To about 2cm^3 of K, add 2 drops of universal indicator and determine the PH.

Observations	Inferences
(1mk)	(1mk)

d) To about 2cm^3 of K in a test tube add all the sodium hydrogen carbonate provided

Observations	Inferences
(1mk)	(1mk)

e) To about 2cm^3 of K in a test tube, add about 1cm3 of acidified potassium dichromate (VI) and warm the mixture.

Observations	Inferences

(1mk)	(1mk)

KAKAMEGA CENTRAL SUB-COUNTY JOINT EVALUATION EXAMS

233/3
CHEMISTRY
PAPER 3
PRACTICALS
JULY/AUGUST

CONFIDENTIAL INSTRUCTIONS TO SCHOOL

-The information contained in this paper is to enable the head of school and teacher in charge of chemistry to make adequate preparations for this year's chemistry mock practical examination. NO ONE ELSE should have access to this paper or acquire knowledge of its contents. Great care must be taken to ensure that the information herein does not reach the candidates either directly or indirectly.

-The chemistry teacher is NOT expected to perform the experiments

- The apparatus required by each candidate for the chemistry mock practical examination are set out on the next page. It is expected that the ordinary apparatus of achemistry laboratory will be available.

- The chemistry teacher should note that it is his/her responsibility to ensure that each apparatus acquired, for this examination agrees with specifications on the next page.

In addition to the fittings and chemicals found in a chemistry laboratory, each candidate will require the following:

1. About 100ml of solution R
2. About 100ml of solution Q
3. About 0.5g of solid Z
4. 10ml of liquid K
5. Blue and red litmus paper
6. 1.06g of solid A (weighed accurately)
7. One measuring cylinder 50ml
8. One plastic beaker of 100ml
9. One pipette 25.0ml
10. One pipette filler
11. One burette 50ml
12. Two conical flasks
13. 10ml measuring cylinder

14. Metallic spatula
15. Five test tubes
16. One boiling tube
17. Test tube holder
18. 250ml of distilled water in a wash bottle
19. Watch glass
20. 250ml volumetric flask
21. Retort stand
22. Part of thongs

Access to:

1. Phenolphthalein indicator
2. 2m NaOH solutions supplied with a dropper
3. 2m NH_3 solutions supplied with a dropper
4. 2m NaCl solutions supplied with a dropper
5. 0.5M $BaCl_2$ solution supplied with a dropper
6. 2M HCl solutions supplied with a dropper
7. 0.5M $Pb(NO_3)_2$ supplied with a dropper PH 1-14
8. Universal indicator solution with a dropper
9. PH chart 1-14
10. 0.2m $NaHCO_3$
11. Source of heat

NB

- Solution R- 2M hydrochloric acid
- Solution Q- 0.4M sodium hydroxide
- Solid Z- Aluminium chloride
- Liquid K- Ethanol Absolute
- Solid –A Sodium carbonate [Na_2CO_3]
- Acidified potassium dichromate[VI]