

**KAKAMEGA CENTRAL JOINT EVALUATION TEST
CHEMISTRY PAPER 2**

MARKING SCHEME

1. a) C_3M_2 /

b) E V

c) K has higher melting point than J

d) has a stronger intermolecular force of attraction than J

e) Ionic radius of K is bigger than the atomic radius of. K reacts by gaining an electron hence increasing repulsion among the electrons

f) J has a smaller radius than C. J has a higher nuclear attraction pulling electrons towards the nucleus.

9) K^- 2.8.8.8 V

C^{2+} 2.8

h) E has a stronger metallic bond than B

E has more valency electrons than B

2. a i) **Mistake**- method of gas collection is wrong

Reason- ammonia is less dense than air

Mistake- flask should be slanting downwards left to right

Reason- water produced may run back and break the flask -r

Mistake- moist reactants should not be used

Reason- ammonia gas will dissolve in water

ii) Calcium oxide—'

iii) $2NH_4Cl_{(aq)} + Ca(OH)_{2(aq)} \rightarrow 2NH_{3(g)} + 2H_2O_{(aq)} + CaCl_{2(aq)}$

iv) Deep a glass rod in conc. HCl and bring it into contact with ammonia in a test tube. It forms a white precipitate. — bi) Until I

ii) A- Nitrogen (II) oxide (NO)

B- Nitrogen (IV) oxide (NO₂)

iii) Nitrogen in NH₃ has an oxidation state of -3 while in HNO₃, it has an oxidation state of +5. increase in oxidation state is oxidation.

iv) $NH_{3(g)} + HNO_{3(aq)} \rightarrow NH_4NO_{3(aq)}$ Molar mass of $NH_4NO_3 = 80 >$

Molar of NH_4NO_3 $\frac{1000 \times 1000}{80}$

Molar ratio = 1 : 1

Molar mass of HNO₃ = 63

Mass of I-1N03 = $\frac{1000 \times 1000 \times 63}{80}$

3. i) Heat

ii) For condensed vapour not to go back to the hot tube which might break

iii) To expel all air hence prevent re-oxidation

— Black copper (II) oxide turns to reddish-brown copper after reduction Colourless droplets collect on cooler parts — Anhydrous copper (II) sulphate turn to blue hydrated copper (II) sulphate

v) Hydrogen gas is explosive in the air i-"

v To prevent re-oxidation of copper metal by air

vi Yellow Lead (II) oxide will turn reddish brown when heated and then reduced to a grey lead metal on cooling

vii -It is neutral to litmus

- it burns with a blue flame

- it reduces metal oxides into metals(it is a reducing agent) [reject]

4. a) Purify to remove impurities, bubble through OH/KOH to remove CO₂, reduce the temperature to remove water vapour, compress to liquify the residue air, then fractional distillation to obtain oxygen at -183°C —

b) i) Concentrated sulphuric (VI) acid V

ii) $SO_{3(g)} + HSO_{4(l)} \rightarrow H_2S_2O_7(l)$ \ (penalize ½ for missing /wrong state symbol

c) i) Platinum/Platinum asbestos - 'i.

ii) It is cheap/cheaper

Not easily poisoned /action stopped by impurities

d) Turns blue to white /'Forms white powder

Sulphuric (VI) acid dehydrates copper (II) sulphate crystals

Removes water of crystallization

e) It is less volatile//volatility//in volatile

f) -Manufacture of sulphate fertilizer I

-Superphosphate fertilizer

-Production of Rayon/ making dyes i—

-Used in car batteries/ as an electrolyte -

-Manufacture of soaps; detergent 'cleaning of metals --

-Manufacture of paints HCl/HNO₃ oleum

-As a drying dehydrating agent/ manufacture of nylon! Al₂SO/ AlCOH₃, sulphate

Drugs pigments.

5. a) Hydrocarbon V / b) i) Fractional distillation 'S-'

ii) Fuel /solvent source of H₂ gas

c) i) L = Calcium carbide, CaC₂

ii) Phosphoric acid/aluminium oxide/ H₂SO₄

iii) H—C≡C—H

iv) Hydrolysis or hydration or oxidation'

d)i) CH₃COOH(aq)+NaOH(aq) CH₃COONa(aq) + H₂O(l)

ii) HCl is fully dissociated While ethanoic acid dissociates partial)Y, therefore Ethanoic acid is weak while HCl is strong.

6. a) Temperature and pressure are directly proportional OR words to that effect

b) With increase in temperature, the gas particle gain kinetic energy, they move faster and collide with the walls of the container more frequently hence increasing pressure. //

$$C) \frac{0.5 \times 100}{T_2} = \frac{4000 \times 1}{500} // T_2 = \frac{50 \times 500}{400} = 62.5K$$

$$ii) \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$\frac{1 \times 400}{500} = \frac{0.5 \times 100}{T_2}$$

$$T_2 = \frac{0.5 \times 100 \times 500}{400}$$

$$= 62.5K$$

d)i) HCl = 36.5g

1 mole = 36.5g

? = 3.65g

X₂CO₃: HCl

1: 2

$$0.000135 \text{ mol} = 25 \text{ cm}^3$$

$$? = 250 \text{ cm}^3$$

$$0.00135 \times \frac{250}{25} = 0.1035 \text{ mole}$$

$$1.86 / 0.1035 = 137.78 \text{ g}$$

b) X₂CO₃ = 137.78 g

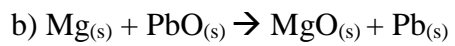
$$2x + 12 + 48 = 137.78 \text{ penalize } \frac{1}{2} \text{ for wrong units}$$

$$2x = 77.78$$

$$x = 38.89 \text{ penalize } \frac{1}{2} \text{ for units given}$$

e) Potassium

7. magnesium is higher in reactivity than metal. It will displace lead from its compound but lead cannot displace magnesium from magnesium compound.



c) i) magnesium

ii) lead (II) oxide

iii) Redox reaction

d) i) Solution A

Sodium hydroxide / potassium hydroxide.

ii) solution C

iii) Solution A

**KAKAMEGA CENTRAL SUB-COUNTY JOINT EVALUATION EXAMS
CHEMISTRY 233/3
MARKING SCHEME**

Q.1. Table	5mks
Complete table.....	1mk
Decimal.....	1mk
Accuracy	1mk
Principal of averaging.....	1mk
Final answer.....	1mk
TOTAL.....	5mk

a)(i) average volume used:

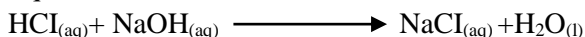
$$\frac{V1+V2+V3}{3} = FA$$

(11) 1000cm³ contains 0.4moles

$$\text{Ans (i) will contain } \frac{\text{ans(i)} \times 0.4}{1000}$$

Ans (ii)

Eqn for the reaction:



Mole ratio : HCl: NaOH

$$1:1$$

Hence number of moles of HCl = number of moles of NaOH

=ans (ii)

(III) number of moles of HCl in 250cm³

25cm³ contains ans (ii) moles

$$250\text{cm}^3 \frac{\text{ans (ii)} \times 250}{25} \quad \text{OR} \quad \text{ans (ii)} \times 10$$

= ans (iii)

(iv) 1000cm³ contains 2moles

$$50\text{cm}^3 \text{ will contain } \frac{2 \times 50}{1000}$$

=0.1moles

(v) Number of moles of HCl that reacted

0.1- ans(iii)

= ans (iv)

(vi) mole ratio:

X₂CO₃: HCl

1: 2

Ans (iv)x1

$$2$$

= ans (vi)

(vii) ans (vi) moles= 1.06g

1mole = $\frac{1.06 \times 1}{\text{Ans (vi)}}$

=RFM of X₂CO₃

$$2x+12+(16 \times 3) = \text{RFM}$$

$$2x = \text{RFM} - 60$$

$$X = \frac{\text{RFM} - 60}{2}$$

$$2$$

2.

Fumes produced turn blue litmus paper red and red litmus remains red. Colorless liquid forms on the cooler parts of the test tube	Acidic gas Hydrated salt
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b)(i)

Dissolves to form a colourless solution	Soluble salt. Absence of coloured ions- Cu^{2+} , Fe^{3+} , Fe^{2+}
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(ii)

White ppt, soluble in excess	Al^{3+} , Pb^{2+} , Zn^{2+} present
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(iii)

White ppt, insoluble in excess	Al^{3+} , Pb^{2+} present
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(iv)

No white ppt formed	Al^{3+} present Pb^{2+} absent
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(v)

No white ppt formed	SO_4^{2-} , SO_3^{2-} , CO_3^{2-} absent
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(vii)

White ppt	Cl^- present
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Q.3.(a)

Burns with a blue flame	Saturated cpd/organic cpd with low C:H ratio -C-C- present, -C=C- absent

(b)

Mixes completely forming a uniform solution	Polar liquid/ miscible liquid

(c)

Changes to yellow , p H=6.5	weakly acidic

(d)

No effervescence/ no bubbles	Absence of H ⁺ /R-COOH K not acidic

(e)

Potassium dichromate(VI) changes from orange to green	R-OH present

