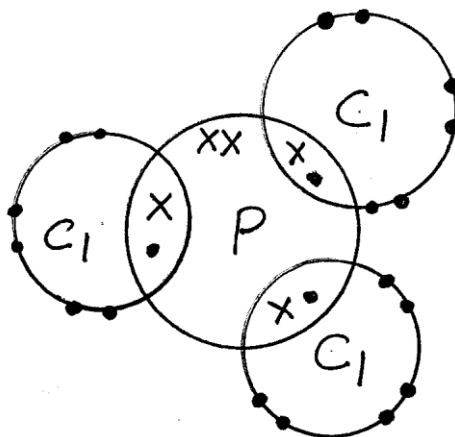


NANDI CENTRAL DISTRICT JOINT EVALUATION TEST - 2020
Kenya Certificate of Secondary Education (K.C.S.E)

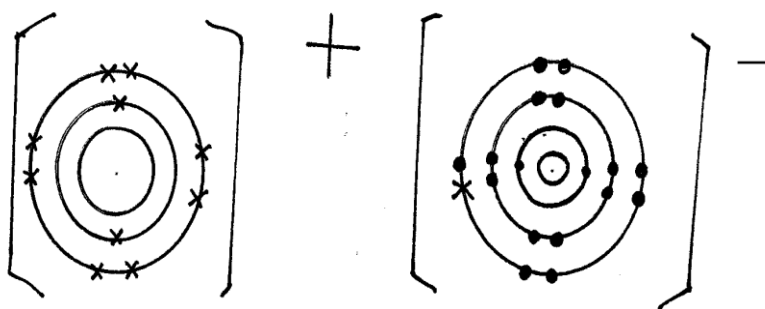
233/2
CHEMISTRY
PAPER 2
MARKING SCHEME

1. a) i) X ✓ ½
 ii) S ✓ ½
 iii) Q ✓ ½ can form a maximum of four strong covalent bonds ✓ 1mk
 iv) Check the grid on the question paper – Group II, period 4 ✓ 1
 v) 2 : 8 : 8 ✓ 1
 Used in light bulbs
 Used in arc welding any 1
- b) i) PCl_3



- ✓ 1 covalent bonds
 ✓ ½ 1 one pair of electrons
 ✓ ½ Configuration of P & Cl

II



Na^+ 2.8

Cl^- 2.8.8

✓1 Covalent bond

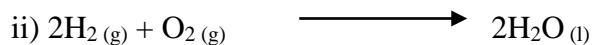
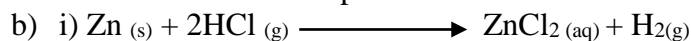
✓1 configuration

ii) It sublimes ✓1 on heating

iii) MgO has giant ionic ✓ 1/2 structure with strong ionic bonds ✓ 1/2 P₄O₁₀ has simple molecular structure with weak intermolecular forces ✓ 1/2

2. I a) Ice cold water ✓1

To condense water vapour formed



c) Introducing a burning splint to ✓ 1/2 mouth containing the gas flame gas off ✓ 1/2 producing pop sound

d) Hardening of ✓1 oil into fats / hydrogenation

II. a) i) Detergents ✓ 1 accept soap

ii) - Sulphur (iv) oxide ✓1

- Nitrogen (IV) oxide

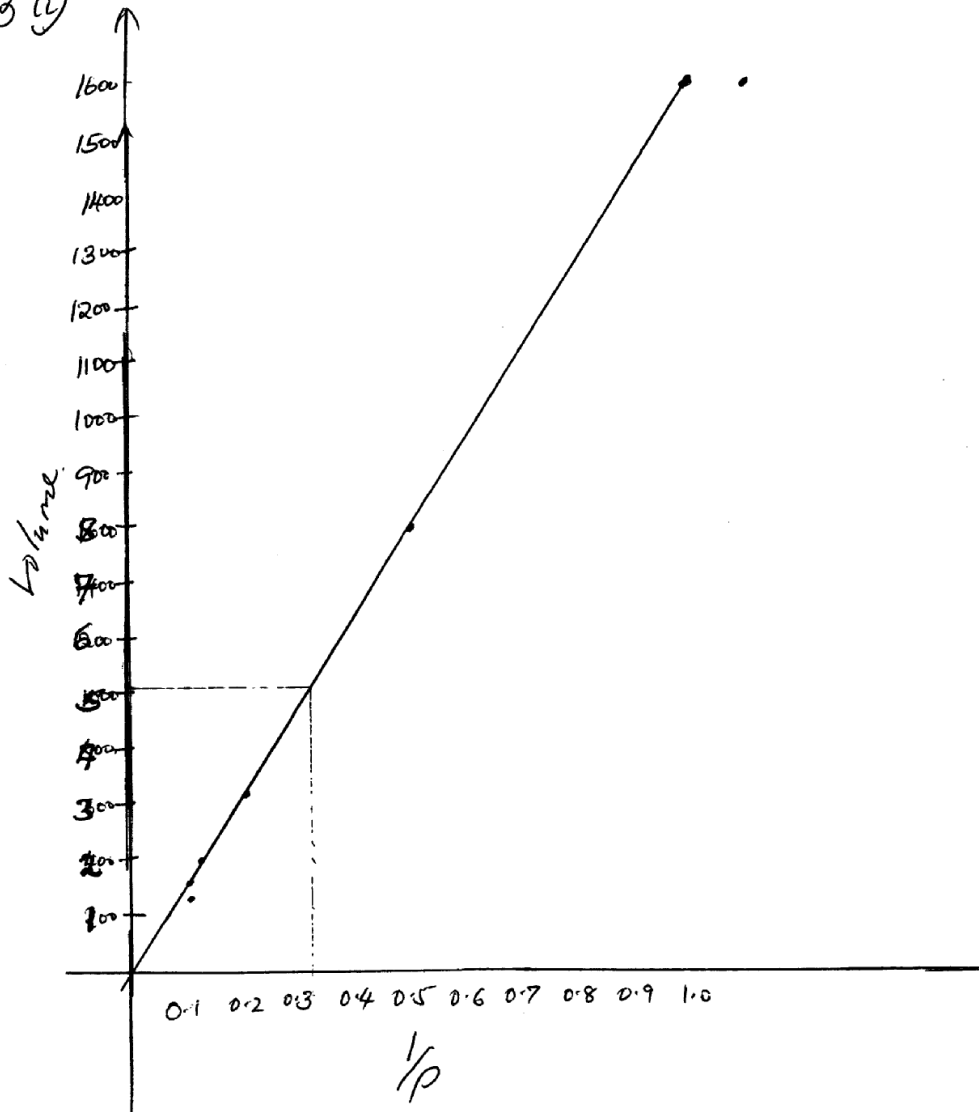
b) Boiling decomposes ✓1 soluble Ca (HCO₃)₂ and Mg (HCO₃)₂ and Mg (HCO₃)₂ into soluble MgCO₃ and CaCO₃

3. i)

I/P	0.1✓	0.125✓	0.2✓	0.5✓	1✓
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ii) graph

Q3 ii)



iii) a) 510 ± 10 penalize $\frac{1}{2}$ mk for ± 2

b) $P2 = \frac{3.2 \times 510}{50} \checkmark 1$

$= 0.3264$ atm penalize $\frac{1}{2}$ for wrong units

iv)

$$\frac{t_a}{t_b} = \sqrt{\frac{M_a}{M_b}}$$

$$\text{RAM } N_2 = 28g \checkmark \frac{1}{2}$$

$$\frac{68.35}{85.65} = \frac{\sqrt{M_a}}{\sqrt{M_b}} \text{ or } \sqrt{\frac{28}{M_b}} = \frac{68.35}{85.65}$$

$$M_b = \frac{(85.65)^2}{(68.35)^2} \checkmark 1 \times 28 \checkmark \frac{1}{2} M_b = \left(\frac{85.65}{68.35}\right)^2 \times 28$$

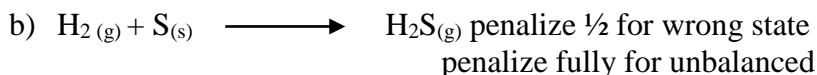
$$= 43.98g \checkmark$$

4. I a) Yellow \checkmark 1 solid melts into amber liquid \checkmark 1

@ 2010 Nandi Central Academic Committee

2mks

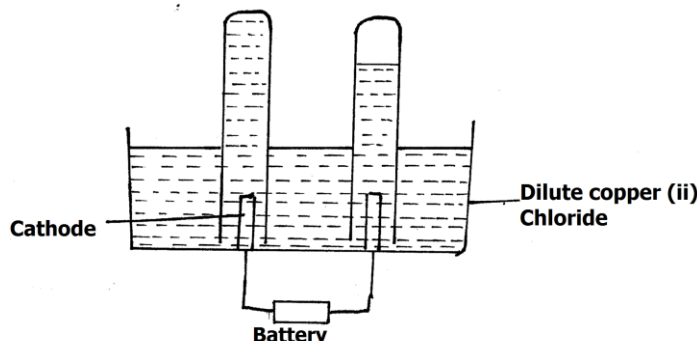
Chemistry 233/1



- II a) K – Hydrogen sulphide ✓ 1 reject H_2S
M – Sulphur (IV) oxide ✓ 1 reject SO_2 ✓ ½
b) i) Blue flame, ✓ ½ misty fumes ✓ ½, choking smell ✓ ½,
ii) - Temp – 450°C ✓ ½
- 2 to 3 atmosphere ✓ ½
- V_2O_5 ✓ ½ / finely divided platinum (pt) on silica
iii) Methylbenzene ✓ 1
iv) A vigorous reaction, that produce dangerous ✓ 1 poisonous fumes occur ✓ 1
c) $\text{Ca}(\text{OH})_2(\text{aq}) + \text{SO}_2(\text{g}) \longrightarrow \text{CaSO}_3(\text{aq}) + \text{H}_2\text{O}(\text{l})$
d) It makes the rubber tougher ✓ 1 less flexible, and less soft; by reducing ✓ 1 number of double bonds

5. I a) Potassium nitrate (KNO_3)_{aq} / or sodium nitrate (NaNO_3) ✓ 1mk
b) i) Complete the circuit by allowing contact between two solutions ✓ 1mk
ii) Maintain balance of charges in electrolysis by providing ions for replacement
c) $\text{Zn}(\text{s}) \longrightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{e}^-$ ✓ 1mk
d) Arrow to the left on the connecting wire ✓ 1mk
e) Any one, blue colour fades/ red brown deposits ✓ 1 / deflection on the voltmeter
II. $\text{Zn}^{2+} + 2\text{e}^- \longrightarrow \text{Zn}(\text{s})$ $E^\theta = -0.76\text{V}$
 $\text{Cu}^{2+} + 2\text{e}^- \longrightarrow \text{Cu}(\text{s})$ $E^\theta = +0.3\text{V}$ ✓ 2mks
 $\text{Zn}(\text{s})/\text{Zn}^{2+} // \text{Cu}^{2+}(\text{aq})/\text{Cu}(\text{s})$ $E^\theta = +1.10\text{V}$ can be used

III.



- b) $4\text{OH}^-(\text{aq}) \longrightarrow 2\text{H}_2\text{O} + \text{O}_2$ ✓ 1 + 4e^-
c) Green blue colour of ✓ 1 solution fades Cu^{2+} ions are removal / conc of Cu^{2+} is reducing / Cu^{2+} ions are discharged ✓ 1

6. a) i) Ethylethanoate ✓ 1
ii) 2-methylhept – 3- yne ✓ 1
b) i) I – Potassium ethoxide ✓ ½
II – Carbon IV oxide ✓ ½
III – Ethylhydrogen sulphate ✓ ½
ii) Hydrolysis ✓ 1
iii) Reagent – conc H_2SO_4 ✓ ½
Condition – $160 - 180^\circ\text{C}$ ✓ ½
iv) Non-biodegradable therefore causes pollution ✓ 1
v) $2\text{C}_2\text{H}_5\text{OH}(\text{l}) + 2\text{K}(\text{s}) \longrightarrow 2\text{C}_2\text{H}_5\text{OK}(\text{aq}) + \text{H}_2(\text{g})$ ✓ 1
vi) Coolant ✓ 1
c) i) Soapy detergent
ii) Advantage – do not form scum with hard water ✓ 1
Disadvantage – contains phosphate which when released to water bodies increases growth of aquatic plants which lead to competition for oxygen with aquatic animals, hence the animals suffocate and dies ✓ 1

- d) i) $C_6H_{12}O_6 \longrightarrow 2C_2H_5OH_{(aq)} + 2CO_{2(g)}$ ✓1
 ii) Its an enzyme ✓ ½ which breaks down the carbohydrates ✓ ½
- 7 a) i) Concentrate the ore ✓1
 ii) Zinc blende ✓1
 iii) $2ZnS_{(s)} + 3O_{2(g)} \longrightarrow 2ZnO_{(s)} + 2SO_{2(g)}$ ✓1
 iv) To neutralize gaseous products that can pollute the environment // scrubbing of gases ✓1
 v) - Making dry cell ✓ ½
 - Galvanizing ✓ ½
- b) i) Galena
 ii) To remove the acidic impurities eg silicon ✓ 1 (iv) oxide // Neutralize acidic compounds to form slag
 $SiO_{2(s)} + CaO_{(s)} \longrightarrow CaSiO_{3(aq)}$ ✓1
 iii) By electrolysis using impure lead as the ✓1 anode and pure lead as the cathode ✓1 Lead (II) nitrates is used as electrolyte (accept diagram / set up draw)