KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

FRIENDS SCHOOL KAMUSINGA HIGH SCHOOL

CHEMISTRY

PAPER 2

MARKING SCHEME

SCHOOLS NET KENYA
Osiligi House, Opposite KCB, Ground Floor
Off Magadi Road, Ongata Rongai | Tel: 0711 88 22 27
E-mail:infosnkenya@gmail.com | Website: www.schoolsnetkenya.com

FRIENDS SCHOOL KAMUSINGA KCSE TRIAL AND PRACTICE EXAM 2016
QUESTION PAPER 2
MARKING SCHEME

1. (a) (i) P an S; ionic radii larger than their atomic radii II gain of electrons causes increase in ionic radius;

(ii) Oxide of R has strong ionic bonds with giants ionic structure; while oxide of S has weak vander waals forces with simple molecular structure;

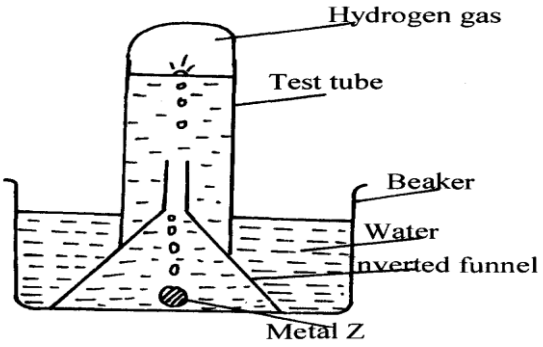
(iii) P and Q; P is a non-metal with the smaller atomic radius hence most electronegative; Q is a metal with the largest atomic radius hence most electropositive;

b) (i) Alkaline Earth metals

(ii) This is the energy required to remove an electron from an atom in gaseous state; II Enthalpy change when one mole of electrons are removed from atoms in a gaseous state;

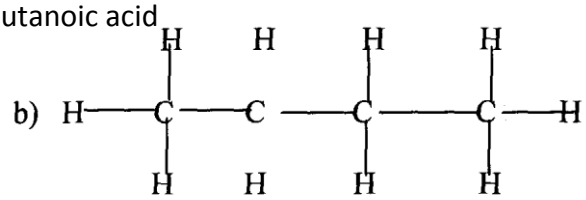
(iii) Attraction between electrons and the positive nucleus in A is higher than in both B and C ***OR*** A has the smallest atomic radius, Therefore, its outermost electrons are more strongly attracted to the nucleus hence more energy is required to remove them;

(iv)



2. a) Butanoic acid

b) Butane



c) $CH_3CH_2CH_2OH + 6O_2 \longrightarrow 4CO_{2(g)} + 5H_2O$

d) (i) **Reagent** : Conc. sulphuric (vi) acid Condition: heating Reagent ethanoic acid
Condition : conc. sulphuric acid and heating

e) Esterification

f) (i) I – Hydrolysis
II - Saponification

3. a) i) On graph paper
S-1 P-1 C-1

ii) $\frac{250 - 180}{25} 1 = 4.66cm^3$

iii) As indicated in graph

iv) $MCO_{3(s)} + 2HNO_{3(aq)} \longrightarrow M(NO)_{(aq)} + H_2O_{(l)} + CO_{2(g)}$

Moles of CO_2 produced $\frac{480}{2400} = 0.02$ moles

Moles ration $MCO_3 : CO_2$

1 : 1

Moles of MCO_3 that reacted 0.02

0.02 moles of $MCO_3 \approx 2.5g$

Molar mass I mol of $MCO_3 \approx \frac{2.5}{0.02} \times 1 = 125$

$M + 12 + 48 = 125$

$M + 60 = 125 - 60$

$M = 65$

b) Set up two marble chips were in powder form which increased the surface 1 area for attack by the acid; hence rate of reaction higher

4. a) Carbon (IV) oxide, sulphur (IV) oxide, dust particles

b) Finely divided to increase surface are for reaction

c) Recycling reduces wastage/ Reduces cost

d) Temperature of 450°C - 500°C

e) - Manufacture of fertilizer e.g. $(NH_4)SO_4$, NH_4NO_3

- Manufacture nitric (V) acid

-Softening of hard water

-Stain remover

-Manufacture of hydrazine used in rocket fuel

f) (i) Platinum/platinum — rhodium

(ii) $4NH_{3(g)} + 5O_{3(g)} \longrightarrow 4NO_{(g)} + 6H_2O_{(g)}$

(iii) Un reacted gases e.g. NH_3, NO

May leak into the environment and cause air pollution

g) (i) Heat is not required √/ rate of production of the gas can be controlled

(ii)There would be no change in both red and blue litmus papers Dry chlorine does not have acidic property and doesn't bleach

(iii) Freshly prepared chlorine water has hypochlorous acid (chloric (I) acid) and therefore bleaches. But when exposed to sunlight chloric (I) acid decomposes into hydrochloric acid and oxygen, is released

(iv) - Heat

- the acid must be concentrated

5. a) - Bauxite√1mk 2 marks

- $A1_2O_3.2H_2O$ √1mk ***-letters in formula should not be joined***

b) Anode: $2O_2 \longrightarrow O_{2(g)} + 4.$ √

Cathode: $Al^{3+} + 3e^- \quad Al_{(aq)}$ √

c) $A1_2O_3$ √ 1mk

d) Lowers the melting point of aluminum from 2050 to 900°C

e) Extraction is not cost effective/ 1

f) **Reacts with O_2** √1mk to form carbon (IV) oxide due to high temperature (√lmk)

g) Does not corrode / Resistant to attack by cooking solutions√ 1mk

h) Forms an oxide √ ½ layer which prevents √ ½ attack by acids and air (1mk)

i) Q = It

3 x 270 √½ x 60 = 48600c

96500c deposits 27g √½ of aluminium 2mks

48600c deposits $\frac{27 \times 48600}{96500}$ = 13.598g√

6. a) i) Gas X is Hydrogen gas√ ½mk

ii) $2H^{+}_{(aq)} + 2e^{-} \longrightarrow H_{2(g)}$

or

H (aq) + e H atom mark

Then $H_{atom} + H_{atom} \longrightarrow H_{2(g)}$

b) The pH will remain √½ as H and OH ions are used up/ or discharged leaving behind Cu2 and SO_4^{2-} ions which are neutral

c) i) At Anode

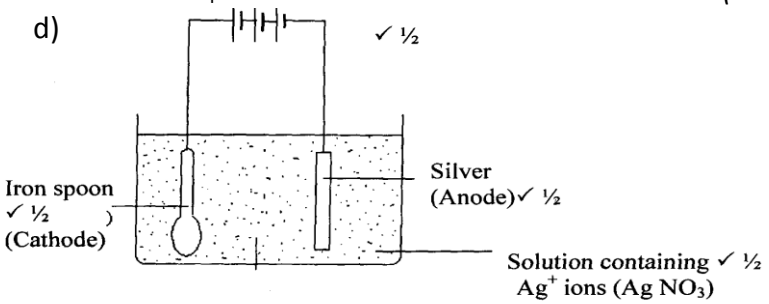
$Cu_{(s)} \longrightarrow Cu^{2+} + 2e^{-}$ 1mk

At cathode: $Cu^{2+}_{(aq)} + 2e \longrightarrow Cu_{(s)}$ √ 1mk

ii) Blue color of solution fades away/ disappears √ ½ mk; a colourless solution is formed ***OR*** solution changes color from Blue to colourless

The blue Cu^{2+} ions produced at Anode are consumed at the cathode, leaving H an SO_4^{2-} ions which are colourless√ 1 mark *(Observation √ ½mk Explanation√1mk)*

d)



(e) It is a weak electrolyte since it ionizes partially// incompletely √

f) All Fe cell

i) $Al_{(s)} / Al^{3+}_{(aa)}$ // $Fe^{3+} / Fe_{(s)}$ √ 1mk

ii) $E^{\theta}_{cell} = E^{\theta}_{Fe} = E^{\theta}_{Al}$

= -0.44-(-1.66)√ ½

= + 1.22 volts (v)√ ½

7. (a)

Chemical reactions	**Nuclear reactions**
involves the outermost energy level of the atom	involves the nucleus of the atom
transfer or sharing of electrons	no transfer / sharing of electrons
Atoms combine	Atoms decay

(b) (i) III –β - Beta V – α -alpha

(ii)

$^{214}_{83}Bi \longrightarrow {}^{210}_{81}Ti + {}^{4}_{2}He$ / $^{214}_{83}Bi \longrightarrow {}^{210}_{81}Ti + \alpha$ /

(c) i) Time taken for a radioactive substance to decay by half or Time taken by a radioactive substance to reduce its activity by half.

ii) 800 g $\xrightarrow{t\,½}$ 400 (g) $\xrightarrow{t\,½}$ 200 $\xrightarrow{t\,½}$ 100 $\xrightarrow{t\,½}$ 50g

4t ½ = l00days√ ½

therefore t ½mk = $\frac{100}{4}$ = 25 days

(d) -Treatment of cancer

- Detection and treatment of thyroid disorders