KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

ALLIANCE GIRLS HIGH SCHOOL

CHEMISTRY

PAPER 2

MARKING SCHEME

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ALLIANCE GIRLS HIGH SCHOOL KCSE TRIAL AND PRACTICE EXAM 2016

QUESTION PAPER 2

MARKING SCHEME

1. (a) (i) **E** √½- has most negative E^{θ} value √½

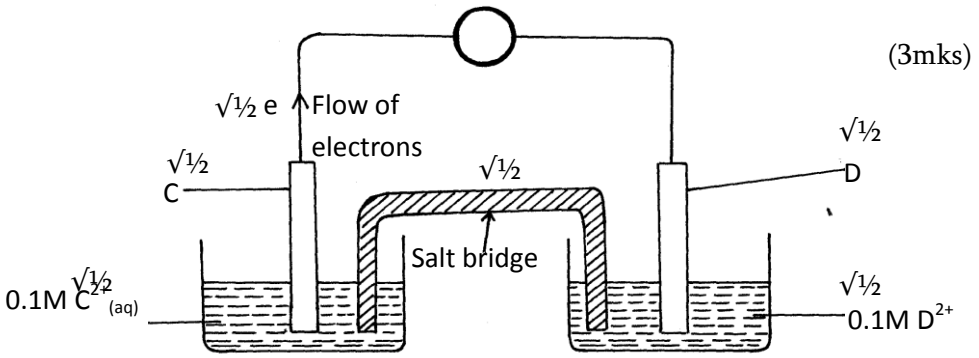
H √½– has the most positive E^{θ} value √½

(ii) $Emf_{cell} = E^{\theta} - E_{Red}$

= +0.44 – 0.34 √½

= +0.10V √½

(b)



(3mks)

(c) (i) **y** √½- hydrogen gas produced at the cathode √½ (1mk)

(ii) $4OH^-_{(aq)} \longrightarrow 2H_2O_{(l)} + O_{2(g)} + 4e^-$ (*penalize ½mk for wrong or missing state symbols*)

(d) (i) No. of moles = $\frac{0.11}{92}$ √1 = 0.0011957 √1 (2mks)

(ii) Q = 1t

= 0.03 x 99 x 60 √½

= 178.2C √½

1mole of e-= 96500C

= 178.2C

No. of moles of electrons = $\left(\frac{1}{96500} \times 178.2\right)$ √½

= **$\underline{0.0018466}$** √½ (2mks)

(iii) If 0.11g of R = 178.2C

92g of R = $\left(\frac{178.2}{0.11} \times 92\right)$ √½

= 149040 √½ (2mks)

If 96500C = 1mole of e^-

149040 = $\left(\frac{1}{96500} \times 149040\right)$

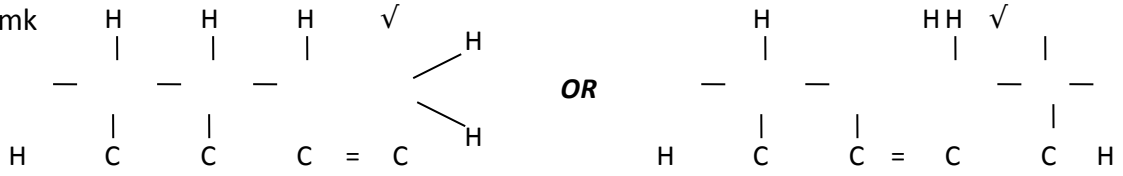
= 1544456 √½

Value of n in R^{n+} = +2 √½

2. (a) Existence of compounds with similar molecular formula but different structural formula.

√1mk

(b)



(c) **A**- H+/$KMnO_4$ remain purple√

B – H^+/$KMnO_4$ would be decolourized due to reduction of purple $MnO_4^-{}_{(aq)}$ √½ to colourless

$Mn^{2+}{}_{(aq)}$ by pent-1-ene

(d) **K** – Ethene √½

L – Concentrated sulphuric (VI) acid √½

M – Water √½

N – Carbon (IV) oxide √½

T – Sodium ethanoate√½

X – Magnesium ethoxide √½

Y – Ethanoic acid √½

Z – chloroethane √½ (4mks)

(ii) **A** – Esterification √½

B – Hydrolysis √½

C- Polymerisation √½

D- Hydrogenation √½ (2mks)

(iii) (3mks)

Process	Condition
A	Drops of concentrated sulphuric acid and warmth √
C	Heat/ high temperatures √
D	Nickel catalyst and temperatures √150^oC – 250^oC

3. (a) Magnesium oxide / MgO √1mk

(b) $MgSO_{4(aq)} + Na_2CO_{3(aq)} \longrightarrow MgCO_{3(s)} + Na_2SO_{4(aq)}$ √1mk

(c) (i) Sodium sulphate √1mk

(ii) Magnesium carbonate √1mk

(d) $MgO_{(s)} + H_2SO_{4(aq)} \longrightarrow MgSO_{4(aq)} + H_2O_{(l)}$ √1

(e) Na^+ √½ and SO_4^{2-} √½ (Sodium and Sulphate ions) (1mk)

(f) $Mg^{2+}{}_{(aq)} + CO_3^{2-}{}_{(aq)} \longrightarrow MgCO_{3(s)}$ √1mk

(g) $MgCO_{3(s)} \xrightarrow{heat} MgO_{(s)} + CO_{2(g)}$ √1mk

4. (a) **V** – 1 √½ **W** – 1 √½ (1mk)

(b) **V** – group 7 **X** – group 2

(c) **V** – period 3 **X** – period 4

(d) **V** √1mk

(e) (i) **WV** √1mk– ***rej VW***

(ii) **XO** √1mk ***rej. OX***

(f) (i) (35 – 17) = 18 neutrons √1mk

(ii) **W** – 19 protons √1mk

5. (a) (a) Sodium nitrate/Potassium nitrate√ ($NaNO_3$/ KNO_3)

(b) In presence of heat √1

(c) Yellow 1√1

(d) Condense the vapour from the retort glass (Nitric acid vapour) √1mk

(e) (i) Nitrogen (II) oxide (NO) √1mk

(ii) Nitrogen (IV) oxide (NO_2) √1mk

(iii) $2NO_{(g)} + O_{2(g)} \longrightarrow 2NO_{2(g)}$ (1mk)

(iv) - Manufacture of explosives √½mk

- Manufacture of fertilizer √½mk (1mk) (any two)

(b) **W** - Hot compressed air (15 atmospheres) √½mk

K – Superheated water (170^oC & 10 atmospheres) √½ (1mk)

(i) **W** – Forces molten sulphur upto the ground surface. √½mk

K – Melts sulphur √½mk

(c) (i) **M** – Dilute Hydrochloric acid √½mk

R – Copper (II) sulphate √½ mk

(ii) Sulphur √1mk

(iii) Use wet **Lead acetate** √½ / **ethanoate** paper√½ H_2S blackens √½ it while SO_2 does not √½ (2mks)

(d) (i) Yield would increase √1mk

(ii) The yield would reduce/decrease √1mk (2mks)

(e) (i) – Dissolve Sulphur (VI) oxide in **concentrated sulphuric (VI) acid** √1to form oleum, then **add water** √1 to oleum to obtain sulphuric acid. (2mks)

(ii) – Manufacture of fertilizers √1mk

- Electrolyte in car batteries √1 any two max 2mks)

6. (a) (i) The **roasted ore is heated with conc. Sodium hydroxide** √1under pressure, Aluminium oxide being amphoteric dissolves in Sodium hydroxide. √1 (2mks)

(ii) Iron (III) oxide/ Iron hydroxide does not dissolve (insoluble in NaOH) √ (1mk)

(iii) Cryolite **lowers** the melting point of alumina √1mk

(b) (i) Salty water attacks oxide layer allowing Aluminium to corrode √1mk

(ii) Aluminium is more √ reactive than Carbon (1mk) // At high temp. Aluminium reacts with Carbon to form Aluminium cabide.

(c) – Metal foil for food packets – Aluminium does not corrode because has thin oxide coat √1mk

- Making aircraft parts and windows – Aluminium alloy is stronger, light and has less tensile strength.

(d) Mass of Al_2O_3 = 20.6

Mass of H_2O = (31.2 – 20.6) = 10.6g √½

Comp.	**Al_2O3**	**H_2O**
Mass	20.6	10.6
No. of moles	$\frac{20.6}{102}$ = 0.201%	$\frac{10.6}{18}$ = 0.58889 √½
Ratio of moles	$\frac{0.2111}{0.2111}$ = 1	$\frac{0.5888}{0.2}$ = 2.9 √½
No. of moles	1	3 √½

Empirical formula $Al_2O_3.3H_2O$ (3mks)

X = 3

7. (a) – Manganese (IV) oxide √1

- Hydrogen peroxide √1

(b) $2H_2O_{2(l)} \longrightarrow 2H_2O_{(l)} + O_{2(g)}$ √½

(c) (i) To ensure that all oxygen has been used √½

(ii) For maximum contact between copper and oxygen so that the reaction occurs √1

(iii) **Brown** √½copper turnings changed their colour to **black** √½ (1mk)

(iv) $2Cu_{(s)} + O_{2(g)} \longrightarrow 2CuO_{(s)}$ √1mk (*penalize ½ k for wrong /missing state symbols*)

(v) $120cm^3 - 95.5 = 24.5cm^3$ √½

$\frac{24.5}{120} \times 100\%$ √½

= 20.4% √1mk (2mks)

(vi) – Used by patients with respiratory problems √1mk