KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

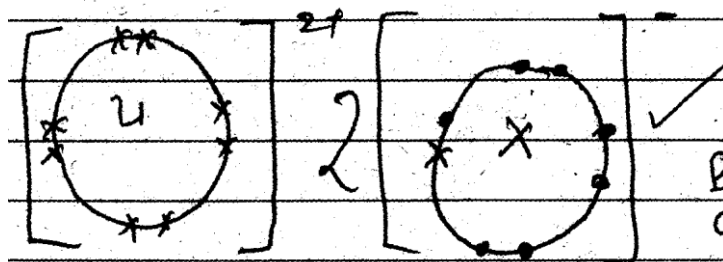**STRATHMORE HIGH SCHOOL**
CHEMISTRY
PAPER 2
MARKING SCHEME

1. (a) (i) **T** – 38 √ (1mk)
   V – 11 √ (1mk)
   (ii) Alkali metals √ 1mk
   (iii) I – These are elements on period 3 atomic radius of **S** is smaller since electrons of
   S experience
   high nuclear attraction √
   II- R – Gains stability by gain √of electrons resulting into electron –repulsion√
   (1mk)
   (iv)

Both ions identified and stable
√ (2mks)

   (v) - Add cold water√ to the mixture and stir to dissolve √ chloride√
       - Filter to √obtain √ chloride as filtrate and Lead chloride as residue. √
       - Evaporate √the filtrate to obtain crystals of √ chloride.
   (b) (i) $MgCl_2$ has ionic bond; √ giant ionic structure√
       PCl_3 has covalent bond; √simple molecular structures. √
       (ii) $AlCl_3 + 6H_2O \rightarrow [Al(H_2O)_5OH]^{2+} + H^+_{(aq)}$

       $AlCl_3$ hydrolyses in water to give hydrochloric acid.

2. (a) (i) A – Concentrated hydrochloric acid√1
          B – water √ 1mk
       (ii) Calcium oxide / CaO√ (1mk)
       (iii) To absorb unreacted /excess chlorine √
       (iv) $2KMnO_{4(s)} + 16HCl_{(aq)} \rightarrow 2KCl_{(aq)} + 2MnCl_{(aq)} + 8H_2O_{(l)} + 5Cl_{2(g)}$ √1
       (v) Solid C sublimes √ hence collects on a cooler place away from heating.
       (vi)

Elements present	Al	Cl
Mass/volume	0.675	$1800cm^3$
R.A.M/M.G.V	27	24000
No. of moles	$\frac{0.675}{27}$ √½ = 0.0025 √½	$\frac{1800}{24100}$ = 0.075
Mole ratio	$\frac{0.025}{0.025}$ = 1 √½	$\frac{0.075}{0.025}$ = 3
	EF = $AlCl_3$ √½	

       $(AlCl_3)n = 267$ √½
       $(27 + 35.5 \times 3)n = 267$
       $n = \frac{267}{133.5} = 2$ √½
       M.F = $(AlCl_3)_2 = Al_2Cl_6$ √½
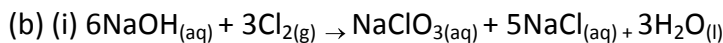
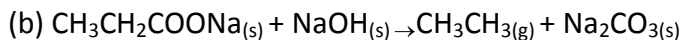(b) (i) $6NaOH_{(aq)} + 3Cl_{2(g)} \rightarrow NaClO_{3(aq)} + 5NaCl_{(aq)} + 3H_2O_{(l)}$
    (ii) Bleaching agent in paper pulp√1 // Used as herbicides √1

(c)   Sulphur (IV) oxide bleaches by reduction√½ and removal of oxygen from the dye hence temporary √½ while chlorine bleaches by oxidation√½/adding oxygen to the dye hence permanent. √½

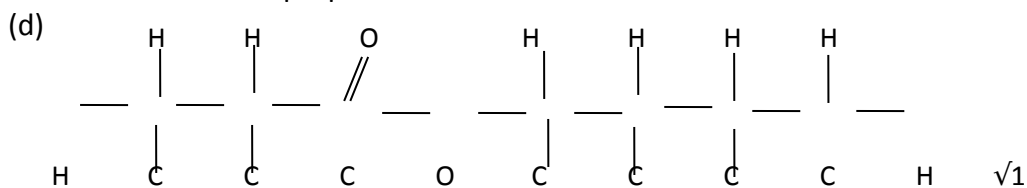3.   (a) (i) Step I – oxidation √½
          Step II – Dehydration √½
    (b) $CH_3CH_2COONa_{(s)} + NaOH_{(s)} \rightarrow CH_3CH_{3(g)} + Na_2CO_{3(s)}$
        (c) A – Potasium propanoate √½
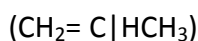   C – Butylpropanoate √½
        D – 1-chloroethane √½
        E – 2 – Chloropropane √½

(d)

(e) Esterification/condensation
(f) Polypropene, √½ polymerization reaction √½

(g) R.M.M of monomer = (12 x 3) + (1x6) = 42
    $(CH_2= C|HCH_3)$
    n = $\frac{35,700}{42}$ = 850

(h)   (i) B √1

        (ii)   it does not form scum √½ /precipitate with hard water.

4.   (a)   Iron (II) oxide √½
            Silicon (IV) oxide√½   (1mk)
        (b)   Reagent A – Conc. Hydroxide
            Reagent C – Cryolite
        (c)   Iron II) Oxide √1. It does not react with Sodium hydroxide solution. √1 (1mk)
        (d)   Mass of water of crystallization = 3.12 – 2.06 √½= 1.06g
            R.F.M pf Al_2O_3 = 27 x 2 + 16 x 3 √½= 102
            If 2.06 = 1.06g of H_2O
            102 = $\frac{(102g \times 1.06)}{2.06}$ of H_2O √1
                =52.04854g
    No. of moles of water in = $\frac{52.4284}{18}$ √½ = 3√½
    (e) To lower the melting point of aluminium oxide hence reduces cost of production.
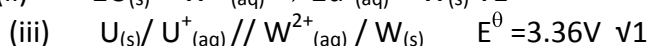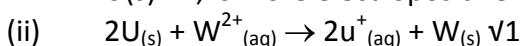   √1

5.   (a)   I. Ions √1
            II. delocalized electrons √1
     (b)   (i) e.m.f $E_{red} - E_{ox}$ √1
            = -2.87 – (-3.02) √1
            = 0.15V √1
            U(s) √1; is more electropositive
    (ii) $2U_{(s)} + W^{2+}_{(aq)} \rightarrow 2u^{+}_{(aq)} + W_{(s)}$ √1
     (iii) $U_{(s)}/ U^{+}_{(aq)} // W^{2+}_{(aq)} / W_{(s)}$ E^{θ} =3.36V √1
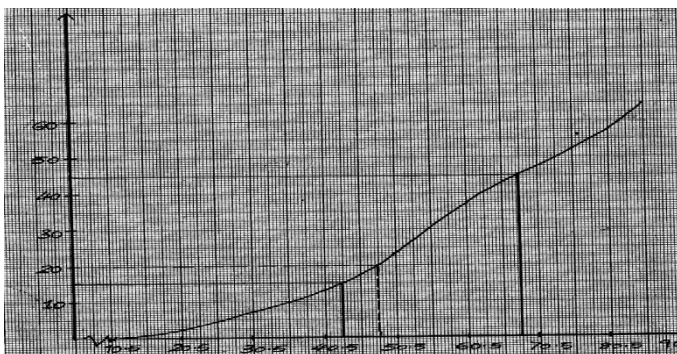
(c) (i)   Cathode   √1
     (ii)   Silver metal   √1
     (iii)   I. $Ag_{(s)} \rightarrow Ag^{+}_{(aq)} + e^{-}$ √1
              II. $Ag^{+}_{(aq)} + e^{-} \rightarrow Ag_{(s)}$ √1
     (iv) Q = It
     = 3 x 5 x 3600
     = 54000C √1
     96500C $\rightarrow$ 108g
     54000C $\rightarrow$ $\underline{54000}$ x 108 √1
              96500
         = 60.44g   √1

6. (a)   (i) Name – Aluminium hydroxide   √½
            Formula: $Al(OH)_{3(s)}$ √½   (1mk)
            (ii) Name: Sodium aluminate √1
             Formular: $NaAl(OH)_{4(aq)}$ √1   (2mks)
   (b)   Amphoterism
   (c) $Al(OH)_{3(s)} + OH^{-}_{(aq)} \rightarrow [Al(OH)_4]^{-}_{(aq)}$ (1mk)

d) i)

  (ii)   I .   33/100g of H_2O (must be on the graph)
         II. $25^{o}C$ √1
         III.   Solubility of X at $30^{o}C$ = $^{19g}/_{100g}$ of water mass of crystals deposited 50-19 = 31g √
                                        (1mk)

7.   (a)   (i)   Water
             (ii)   6.5; √1 presence of Carbonic acid
                     i.e $CO_2 + H_2O \rightarrow H_2CO_3$
             (iii) $2 Na_2O_{2(s)} + 2H_2O_{(l)} \rightarrow 4NaOH_{(aq)} + 2O_{2(s)}$ √1
      (b)   Brown $Fe^{3+}_{(aq)}$ change to green√1 Fe^{2+} ions. H_2S reduced √1Fe^{3+} to Fe^{2+}
      (c)   (i) If CO_2 is bubbled in lime water for a few minutes white ppt. is formed. No white
             ppt. forms   when CO is bubbled into lime water.
              (ii) – Extraction of metals   √1
      (d) CO_2 is highly soluble√½ in sodium hydroxide to form Na_2CO_3 √½soluble in water to form
         Carbonic acid. √ (2mks)