KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

MANG'U HIGH SCHOOL

CHEMISTRY

PAPER 2

MARKING SCHEME

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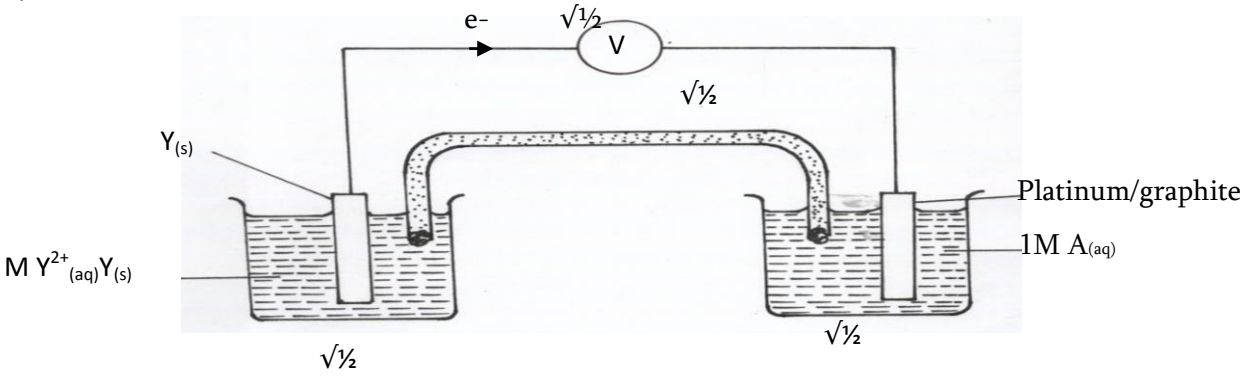
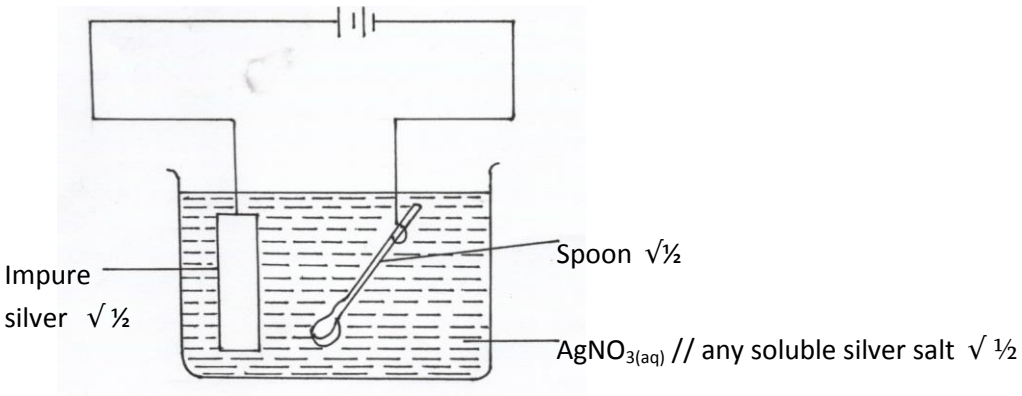
MANG'U HIGH SCHOOL KCSE TRIAL AND PRACTICE EXAM 2016
QUESTION PAPER 2
MARKING SCHEME

1. (a) (i) Group of compounds with similar chemical properties and chemical formula showing a steady gradual change in physical properties√
(ii) Alkanes √
(iii) C_5H_{12} or C_6H_{14} √Boiling points higher than room than temperature √
(iv) Boiling point increases with increase in molecular mass. Strength of intermolecular forces /vander waals forces increases with increase in molecular mass. √
(v) 3rd member – C_4H_8. bubble . $C_4H_8$and C_2H_6 separately into orange Bromine water. C_4H_8 decolourises bromine water but not C_2H_6

2. (a) (i) Z √
(ii



(iii) **correct workable diagram** √ ½



(b) (i) Mg^{2+}, SO_4^{2-}, H^+ and OH^- (1mk for all 4 correct)
(ii) Cathode: $4H^+_{(aq)} + 4e \rightarrow 2H_{2(g)}$ Accept $2H^+_{(aq)} + 2^{e-}\ H_{2(g)}$
(½mk for wrong of missing state symbols)
Anode: $4OH^-_{(aq)} \rightarrow 2H_2O_{(l)} + O_{2(g)} + 4e^-$

(c) pH of electrolyte remains unchanged.√1 Equal amounts of H^+ and OH^- ions are removed during electrolysis√1

(d) $4OH^-_{(aq)} \rightarrow 2H_2O_{(l)} + O_{2(g)} + 4e$-
$25dm^3$ liberated by 4 x 96500C √ ½

$1.2dm^3$ will be liberated by $\frac{4 \times 96500}{}$ x 1.2 √ ½

= 19,300C √ ½

3. (a) Extraction of copper √ 1mk
(b) To provide a large surface area √1
(c) Froth floatation √
(d) I water – sinks earthly impurities and float the ore √1
II. covers the and sinks earthly impurities √1
(e) $FeO_{(s)} + SiO_{2(s)} \rightarrow FeSiO_{3(s)}$ √1
(f) Cu^{2+} √1

4. (a) Time taken for a given mass or number of nuclides to decay to half its original mass or number. √1

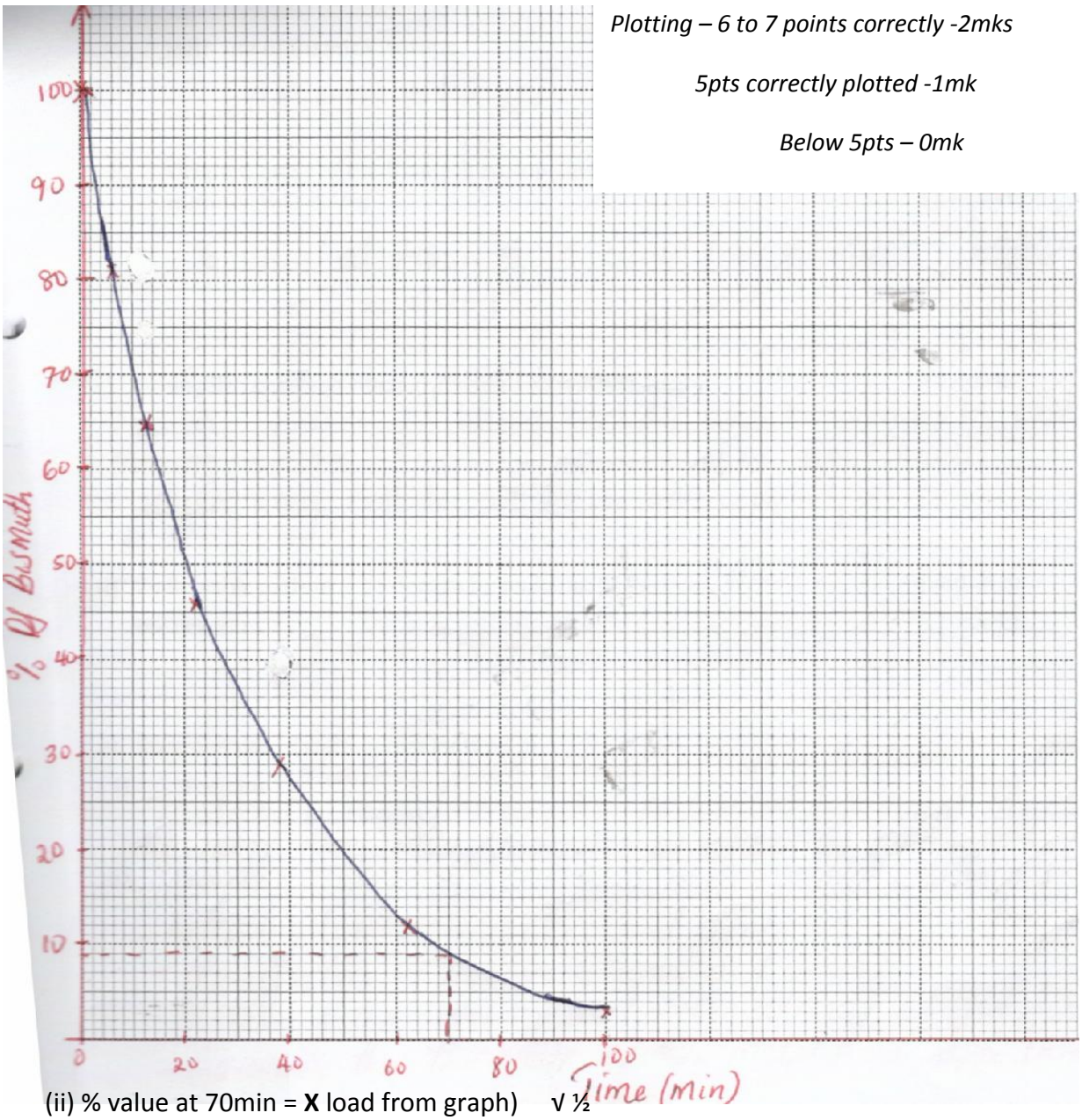
(b) (i)

Scale – 1mk

Plotting – 6 to 7 points correctly -2mks

5pts correctly plotted -1mk

Below 5pts – 0mk



(ii) % value at 70min = **X** load from graph) √ ½

X% = 0.16g

100% = $\frac{0.16 \times 100}{X}$ √1mk = ……g $\frac{0.16 \times 100}{9}$ = 1.778g

{9g ±1)

{0.16 x 100 = 1.778g}

(c) Fission – splitting of heavy nuclides when bombarded by fast moving neutron.
Fusion – combining of light nuclei when they collide at high velocity.

(d)

$$^{14}_{}C \longrightarrow {}^{14}_{}N + {}^{0}_{}e$$

(e) (i) Medicine – Monitoring growth in bones and healing fractures.
Treatment of cancer/sterilization of surgical equipment /regulation of heart pace setters/detection of uptake of iodine-131-in kidneys.

(ii) Industry (1mk)

- Detecting leakages in underground pipes
- Manufacture of nuclear weapons and bombs
- Measuring the level of food in canned and packaged food
- Gauging the thickness of thin metal and paper sheets
- Preservation of food stuffs

5. (a) In group 1 because it **has one valence electron in its outermost energy level. In group (VII)**
It lacks one electron to attain a duplet structure like group (VII) elements.
(b) Bond – covalent √ 1
Structure – giant atomic structure/giant covalent structure. √ 1
(c) **B** or **C** √ 1
(d) Alkaline earth metals √ 1
(e) (i) Atomic radius of **B** is larger than that of **E**√ 1
Effective nuclear charge of **E** is greater than that of **B.** *wtte* √ 1

(ii) Electrical conductivity of elements **E** and **H** (2mks)
E is a good conductor /conductor √ ½ has delocalized electrons .
H is non-conductor √ ½ exists as a molecule (gas) √ ½
(f) (i) pH of solution of C is higher √ 1than that of Sodium chloride solution of C is alkaline √ ½ while Sodium chloride solution is neutral √ ½
(ii) Used in street lights/fluorescent tubes/weather balloons /arc-welding √ 1 (any one)

6. (a) The blue colour of solution fades /changes from blue to colourless Brown solid deposited√ ½
(b) i) No. of moles that reacted Zn = 65

$$\frac{0.65}{65}$$ √ ½ = 0.01moles √ ½

(ii) The no. of moles that was displaced from the solution (Cu =64)

$$\frac{0.64}{64}$$ √ ½ = 0.01moles√ ½

(iii) The mole ratio of Zn: Cu
0.01: 0.01
1:1

(c) $Cu^{2+}_{(aq)} + Zn_{(s)} \longrightarrow Cu_{(s)} + Zn^{2+}_{(aq)}$ / $CuSO_{4(aq)} + Zn_{(s)} \longrightarrow Cu_{(s)} + ZnSO_{4(aq)}$

(d) (i) Enthalpy change that occurs when one mole of a substance is displaced from a solution of its ions √ 1
(ii) 1mole = 205.8Kj

0.01 moles = 205.8 x 0.01√ ½

= 2.059kJ √ ½

Mass of solution = $20cm^3$ x $1g/cm^3$

= 20g √ ½

$H = mc\Delta\theta$

$\Delta\theta = mc\Delta\theta$

$\Delta\theta = \frac{H}{20g \times 4.2Jg^{-1}k^{-1}} = \frac{2.05kJ}{}$ √ 1

$\Delta\theta = 24.5k$ √ ½

7. (a) (i) Mixture of brine (concentrated NaCl) and Ammonia √ 1

(ii) $NaCl_{(aq)} + NH_{3(g)} + H_2O_{(l)} + CO_{2(g)} \rightarrow NaHCO_{3(s)} + NH_4Cl_{(aq)}$ √ 1

- ½ for wrong or missing states

(b) (i) Manufacture of glass √ ½

(ii) Softening of water √ ½

(c) (i) Calcium oxide √ 1

(ii) Calcium Carbonate decomposes on heating to give $CO_{2(g)}$

(d) $2NaHCO_{3(s)} \rightarrow Na_2CO_{3(s)} + CO_{2(g)}) + H_2O_{(l)}$

(e) Ammonia √ ½ and Carbon(IV) oxide √ ½

(f) (C = 12, H = 1, Cl = 35.5, Ca = 40, Na = 23)

$2NaHCO_{3(s)}\ NaCO_3 + CO_{2(g)} + H_2O_{(l)}$

Tones of $NaHCO_3$ = 63.6 x 2 = 127.2tonnes

$NaCl_{(aq)} + NH_{3(aq)} + CO_{2(g)} + H_2O\ NaHCO_{3(s)} + NH_4Cl_{(aq)}$

Or mole ratio NaCl : $NaHCO_3$ √ ½

1:1

Tonnes of NaCl = 127.2 x 1 = 127.2tonnes √ ½