**GATUNDU SOUTH JOINT EXAM Kenya Certificate of Secondary Education**

**CHEMISTRY PAPER 1**

JULY/AUGUST 2019

MARKING SCHEME

1. (i) P – Hexane (1mk)

(ii) W – Water (1mk)

1. To separate samples of CUO and charcoal in test tubes, dilute mineral (1/2mk) acid is added with shaking CUO dissolves to form blue solution (1/2mk) charcoal does not dissolve in dilute mineral acids (1mk)
2. i. Range of boiling points / no sharp boiling points (1mk)

ii. Carry out fractional distillation (1mk)

1. - As a fuel (2mks)

- As a reducing agent

1. a) Anhydrous calcium chloride (1mk)

Drying agent (1mk)

b) 2H2 (g) + 02 (g) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2H20 (g)

1. - Because aluminium has more delocalized electrons (1mk) than magnesium.

- It does not corrode----------------------------------------------------------------------(1mk)

1. - Chlorine bleaches by oxidation while sulphur (iv) oxide bleaches by reduction. (1mk)

- Bleaching by Chlorine is permanent, bleaching by sul;phur (iv) oxide is not permanent. (1mk)

1. i) Excess carbon (iv) oxide

Dilute hydrochloric acid

ii) Mg(HCO3)2(aq) MgCO3(s)  + H2O(l) + CO2(g) 

 Mg(HC03)2(aq) MgO(s) + 2CO2(g) + H2O(l)

iii) Add sodium carbonate/any soluble carbonate (named) solution; (1mk)

Filter (1/2mk)

Dry the residue between two filter papers (1/2mk)

1. a) A (1mk)

It does not form scum/insoluble salt with calcium ions. (1mk)

b) A (1mk)

1. a) The rate of diffusion of a gas is inversely proportional to the square root of its density under the same conditions of temperature and pressure.

b) T1 = M1 100 = 32 (1mk)

 T2 M2 T2 64

for 240cm3 T2 = 100 64

 32

 = 141.42 sec (1mk)

for 300cm3 141.42 x 300

 240

 = 176.78 sec (1mk)

1. i) Fe 20.2/56 S 11.5/32 O 23.0/16 H2O 45.3/18

0.36/0.36 0.36/0.36 1.44/0.36 2.52/0.36

 1 1 4 7

Empirical formula: FeSO4.7H2O

ii) 6.95g = 6.95/278 = 0.025

* 0.05 moles in 250cm3 = 0.025 x 1000/250 = 0.1
1. a) Cracking/catalytic decomposition (1mk)

b) – Increasing volume of hydrocarbons (1mk)

 - Producing Hydrogen in industries/source of Alkene

 - Lowering the Octane-rating

c) – Acidified potassium Manganate (vii) (1mk)

 - Bromine water.

1. a) O e reject beta particle (1mk)

 -1

 b) 1/32 = (1/2) n l (1/2mk)

 (1/2)5 = (1/2) n, n = 5 (1/2mk)

 One half-life = 150/5 = 30days (1mk)

1. i) X – Rhombic (1/2mk)

 Y – Monoclinic (1/2mk)

ii) -Mg has a higher affinity for combined oxygen than S. (1mk)

 - Mg produces a lot of heat which decomposes SO2 into S and oxygen. Oxygen gas support combustion. (1mk)

1. Add 100cm3 of 2M potassium hydroxide or 200cm3 of 1M potassium hydroxide to the acid. (1mk)

Heat the solution until it is saturated (1mk), cool to obtain crystals (1/2mk). Dry crystals between filter papers (1/2mk)

1. 255g of solution cooled, give 124g crystals

50g of solution cooled to give ?

 50 x 124 = 24.314g (2mks)

 255

1. H H H H

 C = C + H – H H – C – C – H 



 H H H H

Bond breaking

4 C – H, 4 X 410 = 1640

C = C, 1 X 610 = 610

H – H, 1 X 436 = 436

 2686 (1mk)

 H = 2686 – 2805

 = -119 Kj/Mol (1mk)

 (1mk)

1. i) will increase (1mk)

ii) Decrease (1mk)

1. i) 200 x 58 x 60 C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_64.8g (1/2mk)

 9500C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_27g (1/2mk)

 27 x 200 x 58 x 60 (1/2mk)

 64.8 x 96500

ii) 40H (g) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2H2 O (l) + O2 (g) + 4e- (1/2mk)

 4 x 96500 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_22.4dm3 (1/2mk)

 200 x 58 x 60 x 22.4

 4 x 96500 C

 =40.39dm3 (1/2mk)

1. a) Mg(s)  + Pb2+ (aq) Mg2+(aq) + Pb(s) (1mk)

b) 0.13 – (-0.76) (1mk)

 = +0.53V (1mk)

1. a) Chlorofluorocarbons// Chlorofluorohydrocarbons// Organic compounds that contains Chlorine and Fluorine (1mk)

b) – Freons (1mk)

 - Aerosols/ sprays

c) Causes depletion of the ozone (1mk)

1. a) Nitrogen (1mk)

b) 3CUO(s) + 2NH3 (g)  3CU(s)  + 3H2O (l)  + N2 (g) (1mk)

c) – Colour change from black to brown (1mk)

 - Droplets of colourless liquid formed on the cooler parts of combustion tube.

1. a) Oxidation (1mk)

b) Propanol forms hydrogen bonds with water propane remains in molecular

form. (2mks)

1. i) Presence of unburnt gases in the almost colourless region of a Bunsen burner

flame. (1mk)

ii) Non-luminous (1mk)

iii) – Very hot (1mk)

 - Pale blue

 - Short and steady

 - Burns with a noise

 - Doesn’t produce soot.

1. a) NaCl don’t undergo hydrolysis in water, AlCl3 undergoes hydrolysis forming HCl (aq) (2mks)

b) Aluminium Chloride exists as a dimer Al2Cl3 when it sublimes at 1830C. (1mk)

1. i) X + 3(-2) = -2

 X = +4 (1mk)

 2.8.2 (1/2mk)

ii) X + 3(-2) = 0

 X = 6 (1mk)

 2.8 (1/2mk)

1. a) Substance that shows a definite colour-in acid and another definite colour in bases. (1mk)

b) Universal indicator gives information on the strength of an acid or base, but acid base indicator only shows whether a substance is an acid or a base. (2mks)

1. i) To lower melting point of ice hence helps to defrost the roads. (1mk)

ii) Salt accelerates the rate of rusts. (1mk)

1. a) NaOCl (1mk)

b) NaOCl (aq) + Dye NaCl (aq) + [Dye + O] (1mk)

 coloured white