9) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

5ml of 0.25M H_2SO_4

$\frac{5}{1000} = 5 \times 10^{-3} dm^3$

Concentration = mol / volume

mol = conc x volume $= 0.25 \times 5 \times 10^{-3}$

$= 1.25 \times 10^{-3}$ mol

$1.25 \times 10^{-3} \times \frac{1}{1} = 1.25 \times 10^{-3}$ mol of $BaSO_4$

mass = M.M x mole $= 1.25 \times 10^{-3} \times 233$

$= 0.291g$

$\frac{\text{Mass of water driven Off}}{\text{mass of hydrate}} \times 100$

$= \frac{113g}{25.0g} = 45.2\%$

c) $C_3H_4 + 4O_2 \rightarrow 3CO_2 + 2H_2O$

moles $= \frac{120}{(12\times3)+4} = \frac{120}{40} = 3$ moles

3 moles $C_3H_4 \times \frac{3 \text{ moles } CO_2}{1 \text{ mole } C_3H_4} = 9$ moles of CO_2

mass = moles × M.M

$= 9 \times 44 = \underline{396g}$

The long term of the periodic table cab be divided into four main blocks, P, S, D, f. The division is primarily based on their electronic configuration

S-block: The elements in which the last election enters the s-sub shell of their outermost energy level are called s-block elements. This block is located at the extreme left of the periodic table. It consist of the group I and II elements.

D-block: The elements in which the last election enters the d-sub shell of penultimate energy level are called d-block elements. Their generatte valence shell configuration is $(n-1)d^{N-10}n^{1-2}$, where n represents the outermost energy level

P-block: elements in which the last election enters the p sub-shell of their outermost energy level are called s- p-block elements. Their general configuration of outermost shell is ns^2np^{1-4}, the only exaption is helium, This block is located at the extreme right of the Periodic table.

F-block: The ~~outermost~~ elements in which the last election enters the F sublevel of the anti-penultimate shells are called f-blocks. Their general configuration is $(n-2)f^{1-14}(n-1)d^{0-1}ns^2$

6) ~~Exray~~ Eye goggles

7.) Because of scrap or piece of paper can get lost easily

8.) density $= \frac{\text{mass}}{\text{volume}}$

$= \frac{8.47g}{3.24cm^3} = 2.6g/cm^3$ or $2614.2g/dm^3$

c) Buffer capacity, $\beta = \frac{dc}{dpH}$

dc = Number of moles of acid or base added per litre of the buffer

dpH = change in pH

5a) $2Al + Fe_2O_3 \longrightarrow Al_2O_3 + 2Fe$

Mass of Al_2O_3 = 124g of Aluminium

moles = $\frac{mass}{M.M} = \frac{124}{26982} = 4.6$ moles

4.6 moles of $Al_2 \times \frac{1 \text{ mol of } Al_2O_3}{2 \text{ mol of } Al}$ = 2.3 moles of Al_2O_3

mass = moles x MM

MM of $Al_2O_3 = (26.982 \times 2) + (3 \times 16) = 101.964$

$2.3 \times 101.964 = 234.5172g \approx 235g$

Mass of excess reagent

= Mass of reagent - mass of product

mass of (Al_2O_3 + Fe)

$Fe_2O_3 = \frac{601}{(2 \times 55.845) + (16 \times 3)} = 3.76$ moles

$3.76 \times \frac{2}{1} = 7.52$ moles of Fe

Mass = moles x M.M

$= 7.52 \times 33.845 = 420g$

excess reagent

$(601 + 124) - (420 + 235)$

= 70g

b) % yield = $\frac{\text{actual yield}}{\text{theoretical yield}} \times 100$

actual yield = 46.0g

theoretical yield given as; $C_6H_6 + Cl_2 \longrightarrow C_6H_5Cl + HCl$

moles = $\frac{40}{(12 \times 6) + 6} = 0.51$ moles

0.51 moles of $C_6H_6 \times 1/1$ = 0.51 moles of C_6H_5Cl

Mass = $0.51 \times 112.5 = 57.375g$

% yield = $\frac{46}{57.375} \times 100 = 80.17\%$

b) $t_{1/2} = 500$

$$500 = \frac{0.693}{k_1}$$

$$k_1 = \frac{0.693}{500} = 1.39 \times 10^{-3}$$

$$k_1 = \ln\left[\frac{a}{a-x}\right]^1/t$$

$$= 1.39 \times 10^{-3} \times 800 = \ln\left[\frac{a}{a-x}\right]$$

$$1.112 = \ln\left[\frac{a}{a-x}\right]$$

$$\ln^{-1}(1.112) = \frac{a}{a-x}$$

$$3 = \frac{a}{a-x}$$

$$3a - 3x = a$$

$$x = \frac{2}{3}a$$

∴ 66.6% of a must have reacted after 800 secs.

4(a) $pH = pK_a + \log_{10}\frac{[\text{base}]}{[\text{conjugate acid}]}$

b) $[H_3O]^+ = K_a\frac{[\text{acid}]}{[\text{conjugate base}]}$

$$= \frac{1.8 \times 10^{-5} \times 0.2}{0.15} = 2.4 \times 10^{-5}$$

$$pH = pK_a + \log\frac{[\text{conj base}]}{\text{acid}}$$

$$pK_a = -\log K_a$$

$$= -\log[1.8 \times 10^{-5}] = 4.74$$

$$4.74 + \log\frac{[0.15]}{0.2} = 4.6$$

SHIGABA ANNA NAMA
HUMAN ANATOMY
CHEM 101 ASSIGNMENT

1.) $^{1}_{1}H \longrightarrow ^{1}_{0}n + ^{0}_{1}\beta$

$^{10}_{6}C \longrightarrow ^{0}_{1}\beta + ^{10}_{5}B$ the product is a boron molecule

$t^{1}/_{2} = 19.2$

$2HI \rightleftharpoons H_2 + I_2$

To calculate Kc;

V = volume of the reaction

$\therefore Kc = \frac{\frac{na}{V} - \frac{na}{V}}{\frac{[2n(1-a)]^2}{V^2}}$

$= \frac{a^2}{4(1-a)^2}$ = where a = 0.223

$Kc = \frac{0.223}{4(1-0.223)^2} = 0.0206$

2.) $\ln\left[\frac{a}{a-x}\right] \times \frac{1}{t}$

a = 46.1

a − x	0	37.1	29.8	19.6
t	0	5	10	20

$\therefore$ at = 5 $K_1 = \ln\left[\frac{46.1}{37.1}\right] \times 1/5 = 0.043$

at t = 10 $K_1 = \ln\left[\frac{46.1}{29.8}\right] \times 1/10 = 0.044$

at t = 15 $K_1 = \ln\left[\frac{46.1}{19.6}\right] \times 1/15 = 0.043$

The constant K_1 proves that the reaction is first order reaction $t^{1}/_{2} = \frac{0.693}{K_1}$

$K_1 = \frac{0.043 + 0.043 + 0.044}{3}$

$= 0.043$

$t^{1}/_{2} = \frac{0.693}{0.043} = \underline{\underline{16.125}}$