MARKING SCHEME CHEMISTRY PAPER 2

1. a) V. has the biggest atomic radius hence it outmost electrons is loosely held.

b) S 1

c) Alkaline earth metals

d) S; is smaller has more protons in its nucleus hence electrons are more attracted

- Nuclear charge is more

e) Q; has 4 electrons in the outer energy level not easy to lose electrons

f) T V 2; lonic/ electrovalent bond

2. 2pbs + 30 2 \_\_\_\_\_\_\_\_ 2Pbo + 2S02 (1mk)

(s) (q) (s) (f)

ii) To avoid poisoning of the catalyst (1mk)

iii) SO3  is absorbed in 98% conc. H 2SO4  to make oleum (1mk)

iii) Sulphur(iv) oxide/ sulphur(vi) oxide (2mks)

v) Mixes with moisture in the air to form acid rain which corrodes buildings /So Causes respiratory problems. (2mks)

vi) To minimize the cost/To increase the yield and minimize the cost. (1mk)

b) Bubbles of a colourless gas

Colourless gas with pungent smell and a brown solution is formed.

Crystals of white sugar – black spoing solid is formed

ii) Iron filings – some SO2  is formed

Fe is oxidized to brown Fe3+ ions

Crystals of white sugar – formation of carbon by dehydration of sugar.

c) Ammonium sulphate

Calcium super phosphate - any one (1mk)

3.– Add Pbo till in excess

-Filter to obtain Pb(vo3) at a fitrate

-Mix the filtrate with H 2SO4

- Filter to obtain Pbso4 precipitate a dry between filter paper.

b) Add methybenzen to dissolve lodine

- Filter and crystallize to obtain lodine

- Heat the residue to subliments NH 4CL

Add water to the residue Nacl dissolves

Filter and crystallize filtrate

c) i) 2NaHCO3 \_\_\_\_\_\_\_\_\_\_\_ Na2 CO3 + Co2(g) + H2 O(i)

Moles of water = 8.4 = 0.1 moles Na2 Co3 = 0.1 /2 = 0.05 R.F.M. 106 Mass 0.05 x 106 = 5.3g

84

ii) moles Co 2– 0.1/2 = 0.05

= 0.05 x 22.4 = 1.1 dm3

1.12dm3

d) I i) Pb(No3)2

ii) Pb(OH)2

II pbO + 2HnO ---- Pb(No3)2 + H 2 O

III Pb 2++  + 2OH- \_\_\_\_\_ Pb(OH)29aq)

4. a) M ethan – 1,2 dio (1mk)

L: Ethanoic acid (1mk)

ii) polymerization (1mk)

iii) Hydrogenation (1mk)

iv) Concentrated sulphuric acid (1mk)

Ethanoic acid (1mk)

v) 2CH 3CH2 CH 2OH(l) + 2Na(s) \_\_\_\_\_\_2CH3 CH 2CH2 OH(i) + H2(g) (1mk)

b) 9.6 + 1.6 + 28.4 =39.6 (1/2mks)

0.4 moles = 39.6g

1mol = 1 x 39.6 (1/2 mks)

0.4

= 99g

RMM = 99(1/2 mks)

ss Element Mass moles mole ratio

E 9.6 9.6 = 0.8 0.8 = 1

1.2 0.8

H 1.6 1.6 = 1.6 1.6 = 2

1. 0.08

CL 28 .4 0.8 = 0.8 0.8 = 1

35.5

Emerical formular

CH2 CL

H= 99 = 2 (1/2 mks)

49.5

Molecular formular

C2 H 4CL2

H H ½ dichloro ethane

iii) CL – C- C – CL

H H 1 1 – dichloroethane (1/2mk)

5 i) Heat of combustion of hydrogen

Heat of formation of water/stream

ii) C 2H6 + 7/2 O

iii) 1560 – (2x394) – 3 x 286)

= -86kjlmo

v) i) 500 x 21.5 x 4.2 = 45.1kj

1000 or 45105J

II Moles of ethane = 45.15

1560

= 0.0289423 mole

Mass of ethane = 0.0289423 x 30

= 0.89g

6 (a) i) carbon(IV) evolved was lost to the atmosphere91mk)

ii) Concentration of reaction higher between Q and R (1mk)

Reaction rate faster (1mk)

iii) grinding the marble chips (1mk)

iv) calcium sulphate (1mk)

v) Plaster of paris (1mk)

b) i) Hydrogen ions discharged (1mk)

It takes less energy than calcium ions (1mk)

iii) 2Cl- (aq) \_\_\_\_\_\_ cl 2 + 2e (1mk)

iii Q= 1t = 4 x 160 x60 (1/2mks)

= 14400c

2x 96500c = 2 x 35.5 (1/2 mk)

1400c = 14400 x 2 x 35.5 (1/2mk)

2x 96500

=5.297g (1/2mk)

7. a) on the graph

b) 18g F1

c) heat the distillled water to 45 c

add solid Q while stirring until no more can dissolve

Filter the mixture to remove undissolved salt.

d) Heat the soln above 80c salt Q will crystallize while p will remain in solution

Filter mixture to obtain the crystals of Q

c) Fractional crystallization

Extraction of salts from Trona