**233/2**

**CHEMISTRY**

**PAPER 2**

**THEORY**

**Kenya Certificate of Secondary Education**

**CHEMISTRY**

**MARKING SCHEME**

1. (a) (i) Hydrogen gas / H2 √1

(ii) Calcium hydroxide √1 formed is slightly √1 soluble in water // Only a few OH- ions are produced in solution.

(iii) - It is used for testing for presence of carbon (IV) oxide √1

- Used in preparation of ammonia.

- Used in preparation of calcium oxide.

Any one correct

1. (i) Step 2 – Excess carbon (IV) oxide √1 CO2

Step 4 – Dilute hydrochloric acid √1, HCl (aq)

Accept formula

(ii) Ca(HCO3)2 (aq) CaCO3 (s) + CO2 (g) + H2O (l) √1

1. Add an aqueous solution of sulphuric (VI) acid √ ½ / add aqueous sodium

sulphate / potassium sulphate √ ½ ( soluble sulphate ) filter √ ½ to obtain calcium

sulphate as residue. Rinse √1 the residue with distilled water to remove traces of

the filtrate. Heat √ ½ the residue to dryness.

2. (a) (i) B is more √1 reactive than A. The valence electrons in B are further from the nucleus than those of A. They therefore experience less nuclear attraction √1 they are lost more readily.

(ii) Atomic size of D is smaller √1 than that of C.

D has more nuclear charge than C hence stronger nuclear attraction √1 to the outermost energy level electrons.

1. Halogens √1
2. D2O5 √1 penalise fully for writing or including D2O3
3. F : 2.5

-Red litmus paper remains red

-While blue litmus paper turned red √ 1 Both correct

Chloride of C hydrolyses in water to form an acidic solution (1mk)

1. 2B(s) + O2 (g)  2BO (s)  equation √1

2g 0.6dm3

x 24dm3

x = 2 x 24

0.6

= 80 √ ½

R.A.M = 80/2 √ ½

= 40 √ ½ penalize ( ½ ) for including units for r.a.m

* Helium is preferred to hydrogen √1 since it is inert unlike hydrogen which is

Explosive when mixed with air.

3. (a) (i) 3-chloroethene √1

(ii) 2-methylpropan -1-ol √1

(b) - To each of the two substances placed in separate test tubes add some sodium carbonate √1

- Effervescence occurs in one of them confirming it is ethanoic acid.

- No effervescence with ethanol √ ½

(c ) (i) Sodium ethoxide √1

(ii) Hardening of oils to make fat / margarine √1

(iii) CH3 COOH + CH3 OH H2SO4 (l)  CH3COOCH3 + H2O √1

Warm

Ignore / do not penalize for wrong states

(iv) To bring the reacting particles close to one another √1

(v) Sunlight / UV √1

(d) Mass of C = 12 x 3.3 = 0.9 g √ ½

44

Mass of H = 2 x 1.8 = 0.2 √ ½

18

C H

0.9 0.2

Moles 0.9 = 0.075 0.2 = 0.2 √ ½

1. 1

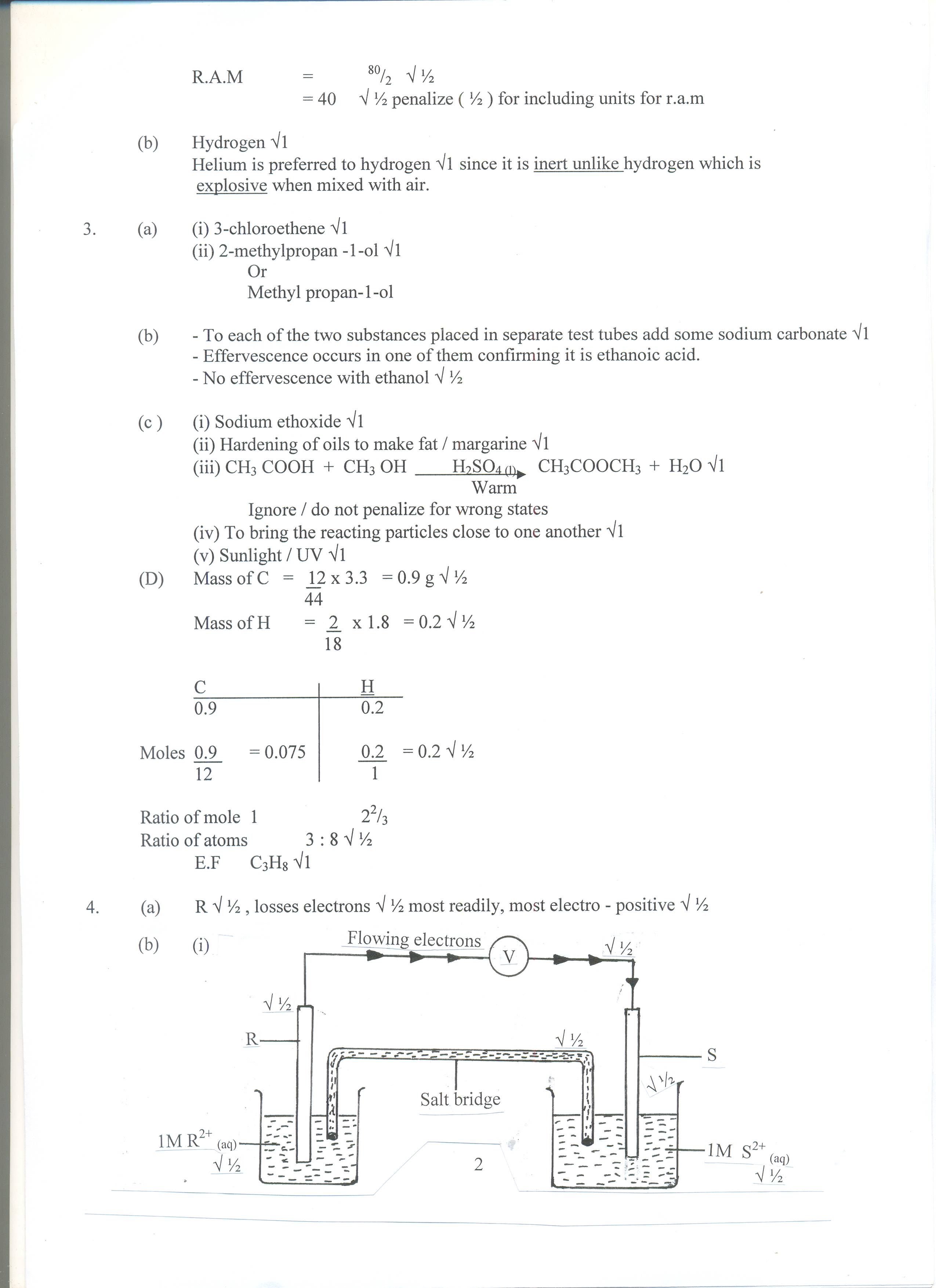
Ratio of mole 1 22/3

Ratio of atoms 3 : 8 √ ½

E.F C3H8 √1

4. (a) R √ ½ , losses electrons √ ½ most readily, most electro - positive √ ½

(b) (i)



(ii) Ecell = E reduced - E oxidsed

= -0.44 – (– 0.76 ) √ ½

= + 0.32v √ ½

(c ) (i) Improve its appearance √1

Prevent it from rusting √1

(ii) Ag+ (aq) + e1 Ag (s) √1

Q = 1t 0.5 x 1 x 60 x 60 = 1800C √ ½

108g requires 1 faraday -1 √ ½

∴ 108g requires 96500C

? 1 800C

108g x 1800C

96500 √ ½

= 2.01 g √ ½

5. (a) - Pass the air through filters √ ½

- Pass the gas through NaOH (aq) √ ½

- Cool to -250C √ ½

- Compress and cool the air to -200 % and 200 atmosphere. Liquid air is obtained √ ½

- Fractionally distil the liquid air √ ½

- Nitrogen gas is obtained at -1960C

NB: The steps should follow one another in that order. If one is wrong the rest after

it do not core.

(b) (i) Platinum √1 / Rhodium gauze catalyst

(ii) Cooling √1

(iii) 4NO2 (g) + 2H2O (l) + O2 (g)  4HNO3 (aq) √1

(iv) Used as a fertilizer √1

(c ) 2 AgNO3 (s)  2Ag (s) + 2NO2 (g) + O2 (g)

(d) Molar mass = 60 √ ½

Mass of nitrogen = 28

% of nitrogen = 28/60 x 100 √ ½

= 46.66% √ ½

1. Neutralisation √1

6.(a) Aluminium is very reactive metal 🗸 hence extracted by electrolysis.

(b) X – Anode 🗸1mk

V – Cathode 🗸1mk

(c) (i) Iron (II) oxide 🗸1mk

Silicon (IV) oxide 🗸1mk

1. Cryolite is added. 🗸1mk This lower the temperature from 2015ºC to 800ºC. 🗸1mk

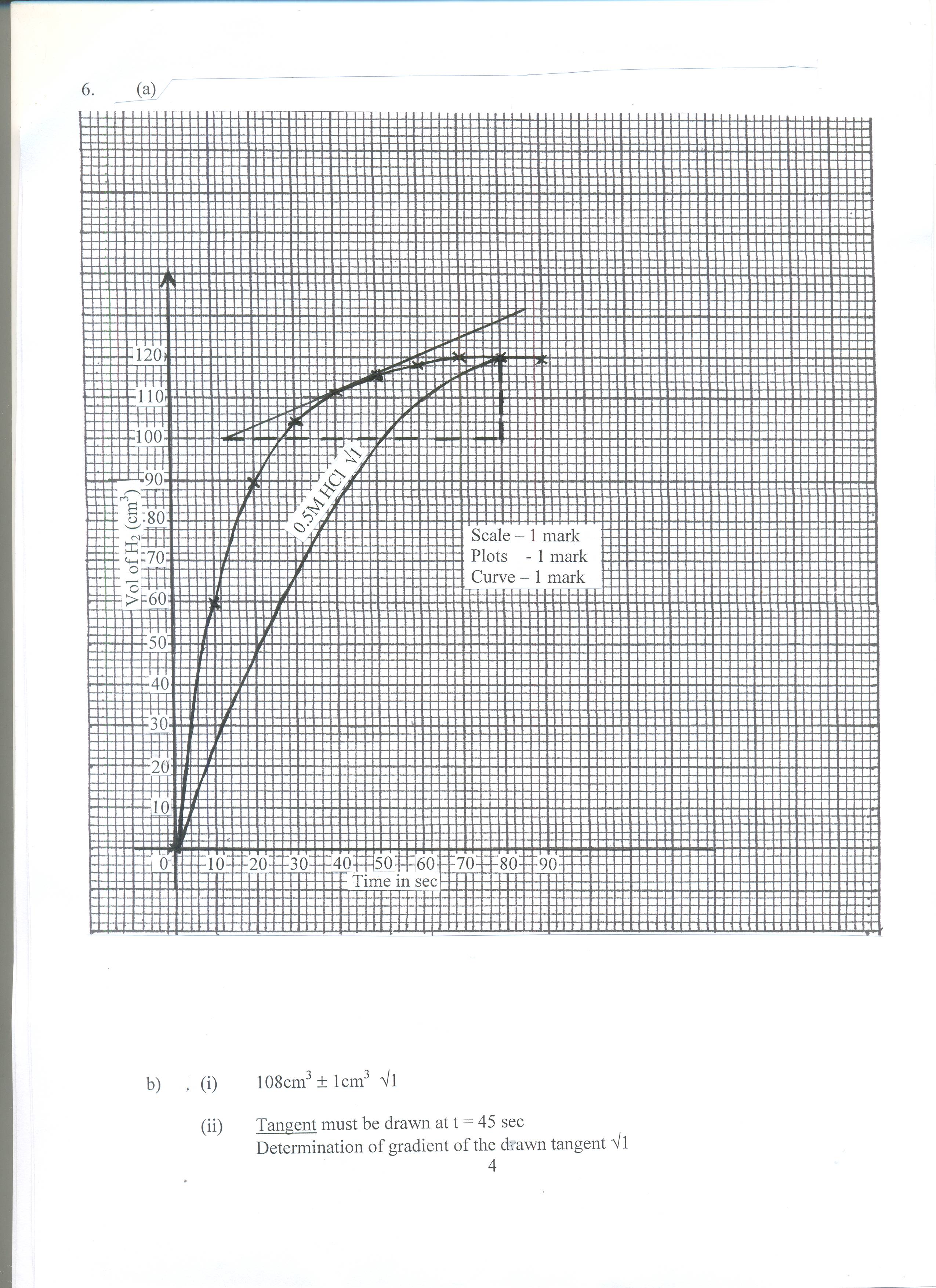
(d) Anode 6O2- → 6Og + 12e OR 6O2- → 3O2 + 12e 🗸1mk

1. The anode. 🗸 The oxygen liberated at the anode reacts with carbon anode to🗸

form carbon (IV) oxide hence its corroded.

1. - Stronger than pure aluminium.
   * Harder than pure aluminium.
   * Has higher tensile strength than aluminium.
   * Not easily corroded compared to aluminium.
   * More durable. (Any 1mk)

7. (a)



b) (i) 108cm3 ± 1cm3 √1

(ii) Tangent must be drawn at t = 45 sec

Determination of gradient of the drawn tangent √1

Rate of change = 129 – 100 √ ½

80 – 12

= 29/68

= 0.4265cm3 / second √ ½

(b)No effect on equilibrium √ pressure change has no effect on reactions where there is no

change in volume when change goes either way. √1

(ii) Equilibrium shifts to the right more products are formed √1

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