**SUNRISE 2 EXAMINATION**

**CHEMISTRY PP2**

**MARKING SCHEME**

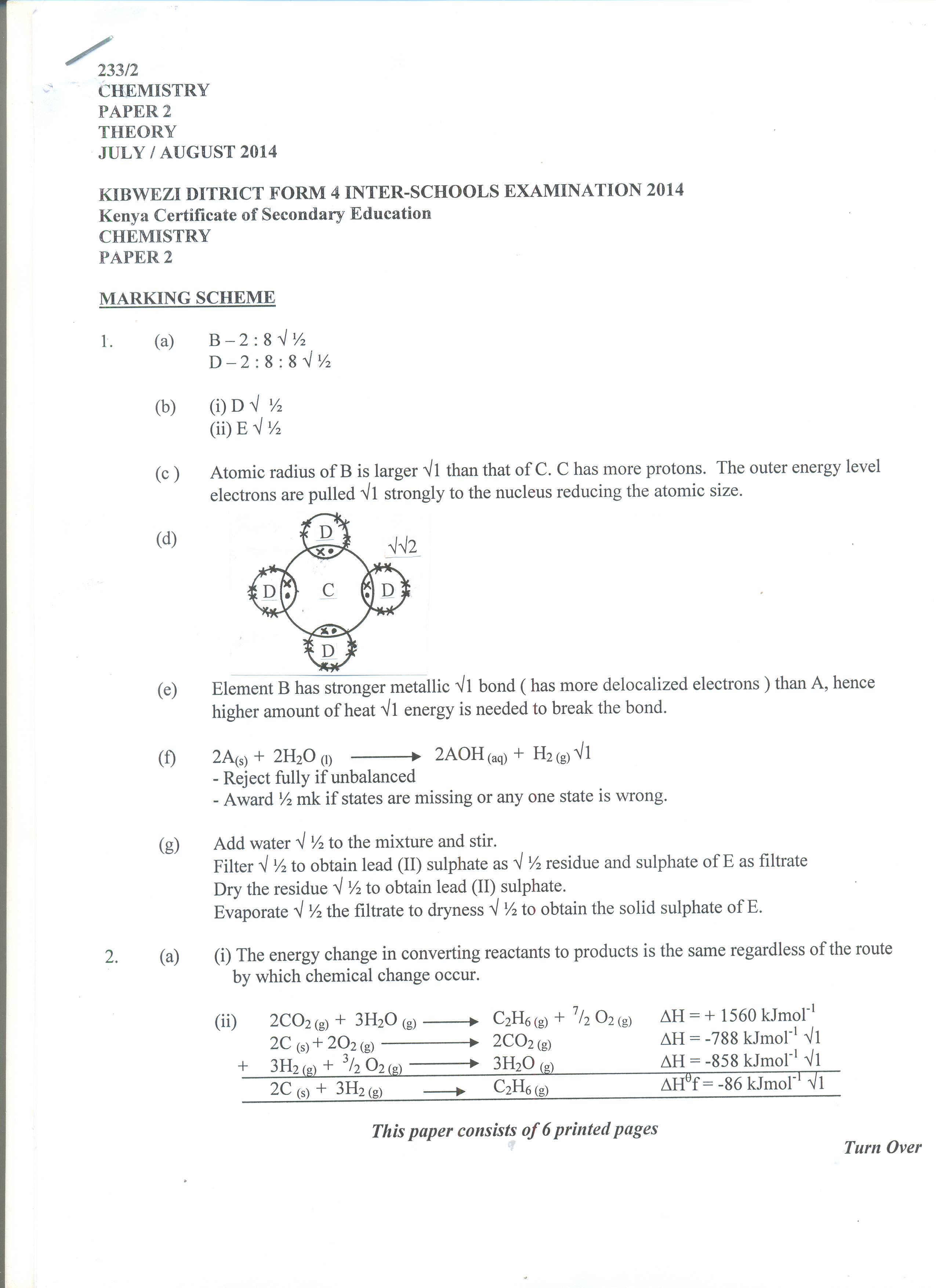
1. (a) B – 2 : 8 √ ½

D – 2 : 8 : 8√ ½

(b) (i) D √ ½

(ii) E √ ½

(c ) Atomic radius of B is larger √1 than that of C. C has more protons. The outer energy level electrons are pulled √1 strongly to the nucleus reducing the atomic size.



(d)

(e) Element B has stronger metallic √1 bond ( has more delocalized electrons ) than A, hence higher amount of heat √1 energy is needed to break the bond.

(f) 2A(s) + 2H2O (l)  2AOH (aq) + H2 (g) √1

- Reject fully if unbalanced

- Award ½ mk if states are missing or any one state is wrong.

(g) Add water √ ½ to the mixture and stir.

Filter√ ½ to obtain lead (II) sulphate as √ ½ residue and sulphate of E as filtrate

Dry the residue √ ½ to obtain lead (II) sulphate.

Evaporate √ ½ the filtrate to dryness √ ½ to obtain the solid sulphate of E.

2. (a) (i) The energy change in converting reactants to products is the same regardless of the route by which chemical change occur.

(ii) 2CO2 (g) + 3H2O (g)  C2H6 (g) +  7/2 O2 (g)  ΔH = + 1560 kJmol-1

2C (s) + 2O2 (g)  2CO2 (g)  ΔH = -788 kJmol-1 √1

+ 3H2 (g) + 3/2 O2 (g) 3H2O (g)  ΔH = -858 kJmol-1 √1

2C (s) + 3H2 (g)  C2H6 (g)  ΔHθf = -86 kJmol-1 √1

OR

2C (s) + 3H2 (s)  ΔHθf C2 H6 (g)

ΔH1 ΔH2

ΔH3 √1

2CO2 (g) + 3H2O (g)

ΔHθf (C2H6) = 2ΔH1 + 3ΔH2 - ΔH3

=2 (-394) + 3(-286) – (-1560) √1

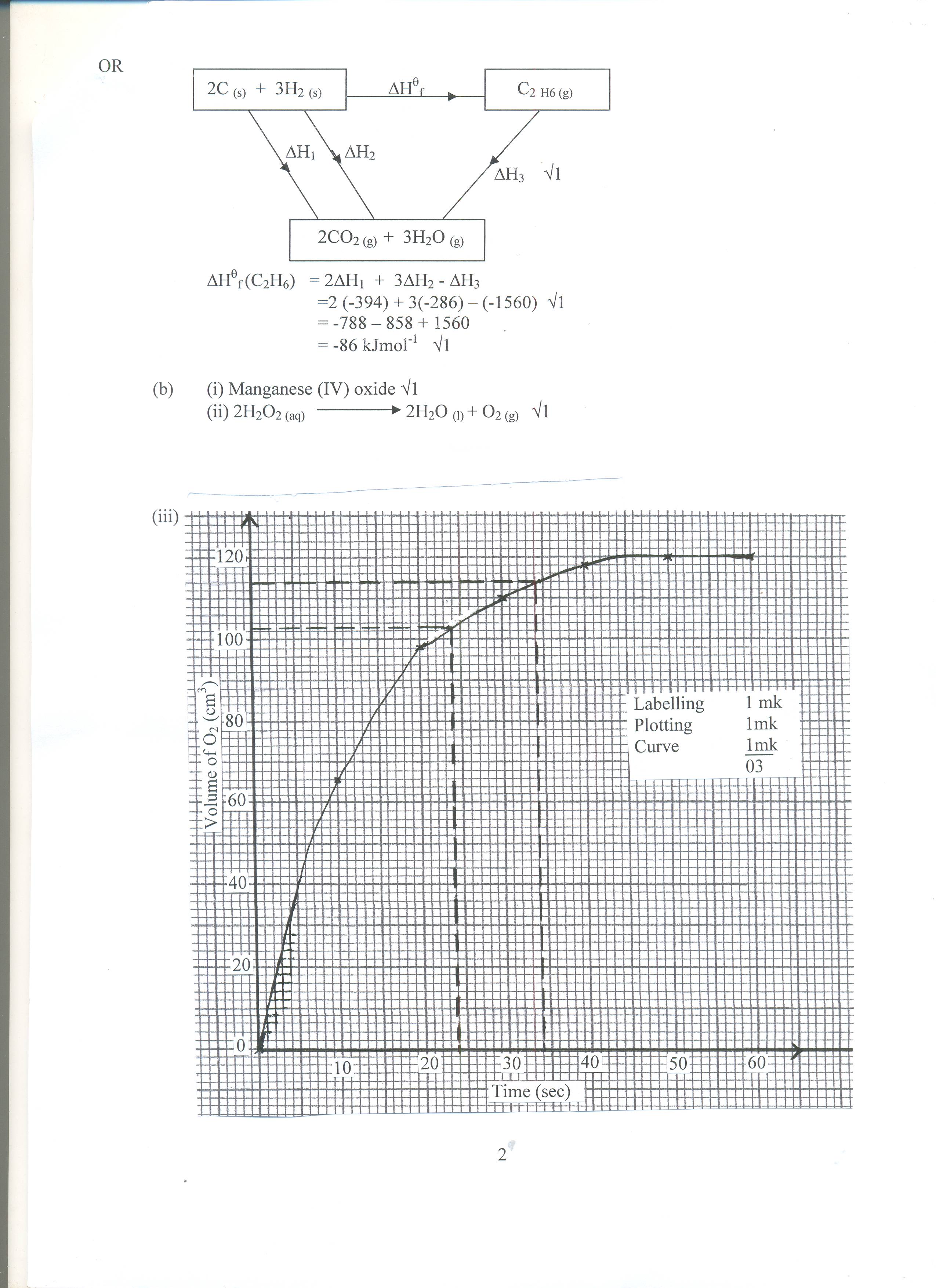
= -788 – 858 + 1560

= -86 kJmol-1 √1

(b) (i) Manganese (IV) oxide √1

(ii) 2H2O2 (aq)  2H2O (l) + O2 (g) √1

(iii)



2

(iv) Average rate = 114 – 103 √1 = 11 = 1.1 ± 0.1cm3 s-1 √1

34 – 24 10

Missing units in the answer penalize ½ mk on correct answer.

(v) The reactant have been used up √1

3. (a) (i) Calcium (II) carbide √ ½

(ii) CaC2 (s) + 2H2O (l)  Ca (OH)2 (aq) + C2H2 (g) √1

(iii) Ethyne gas is insoluble in water √1

(iv) A mixture of oxygen and ethyne gas forms oxyacetylene flame used for

welding and cutting of metals √1

(b) (i) 1,1,2,2-tetrabromoethane √ ½

Br Br

H C C H √ ½

Br Br

(ii) I) Hydrogen gas √ ½

II) Hydrogen chloride (HCl) √ ½

(iii) H H

C C √1

H Cl n

1. Polychloroethane √1

(v) - Making crates and boxes

- Making plastic ropes

- Making water pipes

- Insulation for electrician wires Any 1 correct use

(c ) (i) Concentrated sulphuric (VI) acid √ ½ Reject sulphuric (VI) acid

(ii) Ethylethanoate √ ½

(iii) H O H H

H C C O C C H √1

H H H

(iv) Esterification Neutralization

- Reaction is slow - Reaction is fast

- Reaction is reversible - Reaction is irreversible

- Forms esters ( molecular ) - Forms salts (ionic)

Any 1 correct each 1 mark

(v) Heating value = molar enthalpy of combustion

Molar mass of compound

= 2877 kJmol √ ½

58g

= 49.603 kJ g-1 √ ½

4. (a) (i) Frothing agent / vegetable oil √1

(ii) Sand / clay or galena (PbS) or slurry √1

(iii) A – Air √ ½

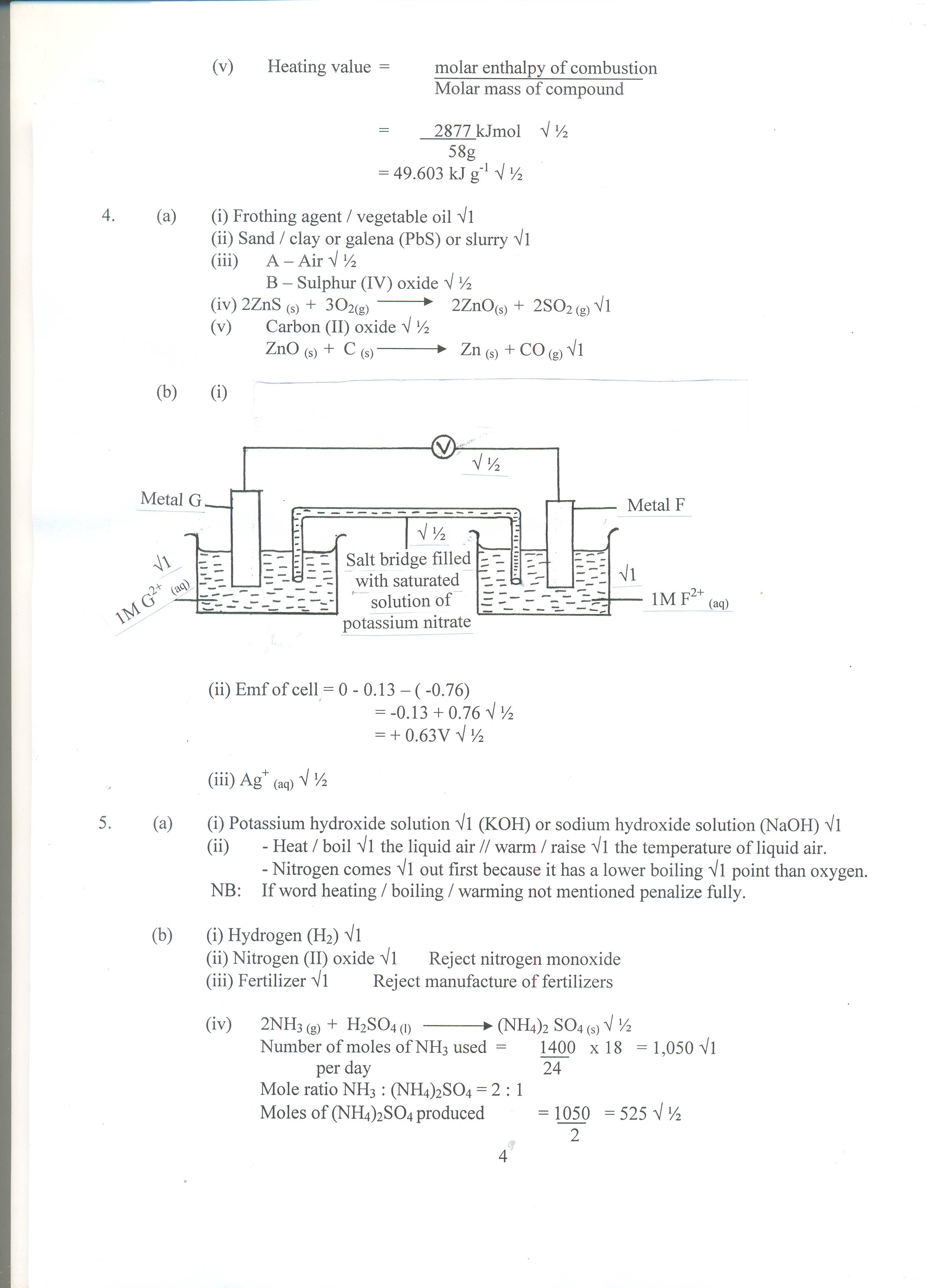
B – Sulphur (IV) oxide √ ½

(iv) 2ZnS (s) + 3O2(g)  2ZnO(s) + 2SO2 (g) √1

(v) Carbon (II) oxide √ ½

ZnO (s) + C (s)  Zn (s) + CO (g) √1

(b) (i)



(ii) Emf of cell = 0 - 0.13 – ( -0.76)

= -0.13 + 0.76 √ ½

= + 0.63V √ ½

(iii) Ag+ (aq) √ ½

5. (a) (i) Potassium hydroxide solution √1 (KOH) or sodium hydroxide solution (NaOH) √1

(ii) - Heat / boil √1 the liquid air // warm / raise √1 the temperature of liquid air.

- Nitrogen comes √1 out first because it has a lower boiling √1 point than oxygen.

NB: If word heating / boiling / warming not mentioned penalize fully.

(b) (i) Hydrogen (H2) √1

(ii) Nitrogen (II) oxide √1 Reject nitrogen monoxide

(iii) Fertilizer √1 Reject manufacture of fertilizers

(iv) 2NH3 (g) + H2SO4 (l)  (NH4)2 SO4 (s) √ ½

Number of moles of NH3 used = 1400 x 18 = 1,050 √1

per day 24

Mole ratio NH3 : (NH4)2SO4 = 2 : 1

Moles of (NH4)2SO4 produced = 1050 = 525 √ ½

2

4

Mass of (NH4)2SO4 produced per day = 525 x 132 = 69.3kg √1

1000

6. (a) A – Ammonia √1

B – Calcium oxide √1

(b) CaO (s) + H2O (l)  Ca(OH)2 (aq) √1

(c ) Reaction is exothermic √1

(d) Filtration √1

(e) - Ammonia √1

- Carbon (IV) oxide √1

(f) (i) C (s) + 2H2SO4 (l)  CO2 (g) + 2H2O (l) + 2SO2 (g) √1

(ii) Oxidising property √1

(g) - Manufacture of glass √

- Softening of hard water √

- Making of soaps and detergents √

- For making sodium hydrogen carbonate used in baking soda and fire extinguishers √

Any 2 correct answers each ½ mk

7. (a)



5

(b) Zn (s) + 2HCl (aq) Zn Cl2 (aq) + H2 (g) √1

(c ) Reaction between calcium and acid is explosive and dangerous. √1

(d) It contains impurities i.e. other gases e.g nitrogen, neon present in air √1

(e) (i) Copper (II) oxide changes from black √ ½ to brown solid √ ½ .

(ii) CuO (s) + H2 (g) Cu (s) + H2O (l) √1

(iii) Reducing property √1

(iv) Potassium cannot √ ½ be displaced from it’s oxide by hydrogen because

it is high √ ½ in the reactivity series.

(v) It is hardening of oils to form fats √1 by passing hydrogen gas in presence

of nickel catalyst.

(vi) - A mixture of oxygen and hydrogen burns to produce oxy-hydrogen flame used in welding and cutting of metals.

- Manufacture of ammonia is haber process.

- Manufacture of hydrochloric acid

- As a fuel cells

- As a fuel in rockets

Any 1 each 1 mark