233/2 CHEMISTRYMARKING SCHEME PAPER TWO

1. a) i) I – Condensation
II – Melting
ii) Iodine, Benzoic acid, campor, Dry ice(solid CO_2) Natphalene.
ii) $H_2O_{(g)} \longrightarrow H_2O_{(s)}$

b) i) I – Van der waals and hydrogen bonding.
II – Van der waals forces.

ii) I- The separation distance is smaller during fusion than during vaporization hence requires much lower energy than in vaporization and vice versa.

II – Heating time in NP is far much less than heating time in QR.

2. a) i) Element R. Because it has the largest atomic radius hence its outer electron is not held strongly by the protons.
ii) P has more protons than N hence greater nuclear charge.
The electrons of P are therefore attracted strongly to the nucleus making it small.
iii) a) $2M_{(s)} + 2H_2O_{(l)} \longrightarrow 2MOH_{(aq)} + H_{2(g)}$

moles of H_2
$24dm^3$ _____ 1mole
$0.2dm^3$ _____ ?
$\frac{0.2 \times 1}{24} = 0.00833$moles

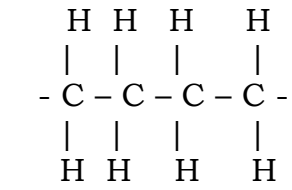
moles of M
0. 00833 × 2 = 0.0167
But 1 Mole Of M _____ 7g
0.0167 Moles _____ ?
$\frac{0.0167 \times 7}{1} = 01169$ g.

b) i) Calcium is W. calcium, being a metal forms a basic oxide consisting of ionic bond.
ii) Carbon is Y. Carbon burns in Limited oxygen to form carbon (II) oxide which is a neutral gas.
iii) Sulphure isV. Sulphur being a non-metal burns to form acidic sulphur (VI) oxide that is covalently bonded.

3. a) i) 2,2 – dimethylpropane or dimethyl, propane.
ii) Pent-2-yne.

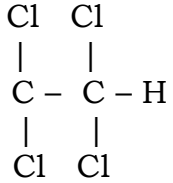
b) Add acidified potassium manganate (VII) solution to both separately.
CH_3 C= CCH_2CH_3 will turn potassium manganite (VII) from purple to colorless white $CH_3C(CH_3)_2$ CH_3 will have no effect.

c) i) I – L – ethylethanoate
II – N – ethane

ii)


iii) Reagents – water
condition – concentrated sulphuric (VI) acid.

Iv) I – Step 2 – esterification.
II – step 3 – substitution.

d)


4. a) i) Sodium chloride or potassium chloride.
ii) M-Concentrated sulphuric (VI) acid.
iii) A green solid of Iron (II) chroride is formed.
iv) $Fe(s) + 2HCl(g) \rightarrow FeCl(s) + H_2(g)$
v) To prevent it from mixing with air since the mixture is explosive when ignited.

b) i) I – Silver chloride which is insoluble is formed and hence appears as white precipitate.
II – This is because hydrogen chloride reacts with ammonia to form ammonium chloride.
ii) Used in sewage treatment.
Manufacture of polymers such as polyvinylchloride.

c) i) Calcium hydroxide.
ii) Addition of bleaching powder introduces calcium ions which makes water hard and hence a lot of soap is needed to from lather.

d) i) X – Hot compressed air.
ii) In order to melt sulphur in the deposit.

iii) Sulphur is not soluble in water / melting point of sulphur is lower than that of superheated water(170^0c)

5. a) RAM = $\frac{(78.6 \times 24) + (10\times25) + (11.4 \times26)}{100}$

$= \frac{1886.4 + 250 + 296.4}{100}$

$= 24.3$

b) i) Magnesium oxide

ii) I – Ammonia gas.

II – used in manufacture of fertilizers.

c) i) Water sample I.

This is because the amount of soap to lather reduces after the water is boiled.

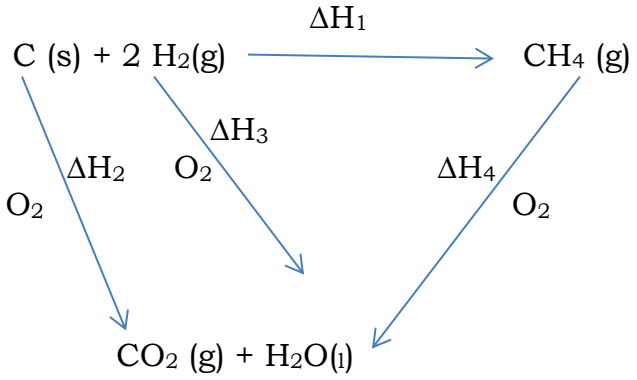
ii) This is because the sample contains water which has permanent hardness . This hardness cannot be removed by filtration but it is removed through distillation.

iii) Leads to wastage of soap during washing.

Deposits fur in boilers which reduces the efficiency of boilers.

6. a) i) It is the enthalpy change when one mole of a compound is formed from its constituent elements in their standard states.

ii)



II $\Delta H_1 = \Delta H2 + \Delta H_3 - \Delta H_4$.

$= (-393) + (-286 \pm 2) - (890)$

$= -75$kJ/mole.

b) Concentration of either reactants or products.

c) i) On graph paper.

Plotting – 1mk.

Scale – ½.

Curve – 1 mk.

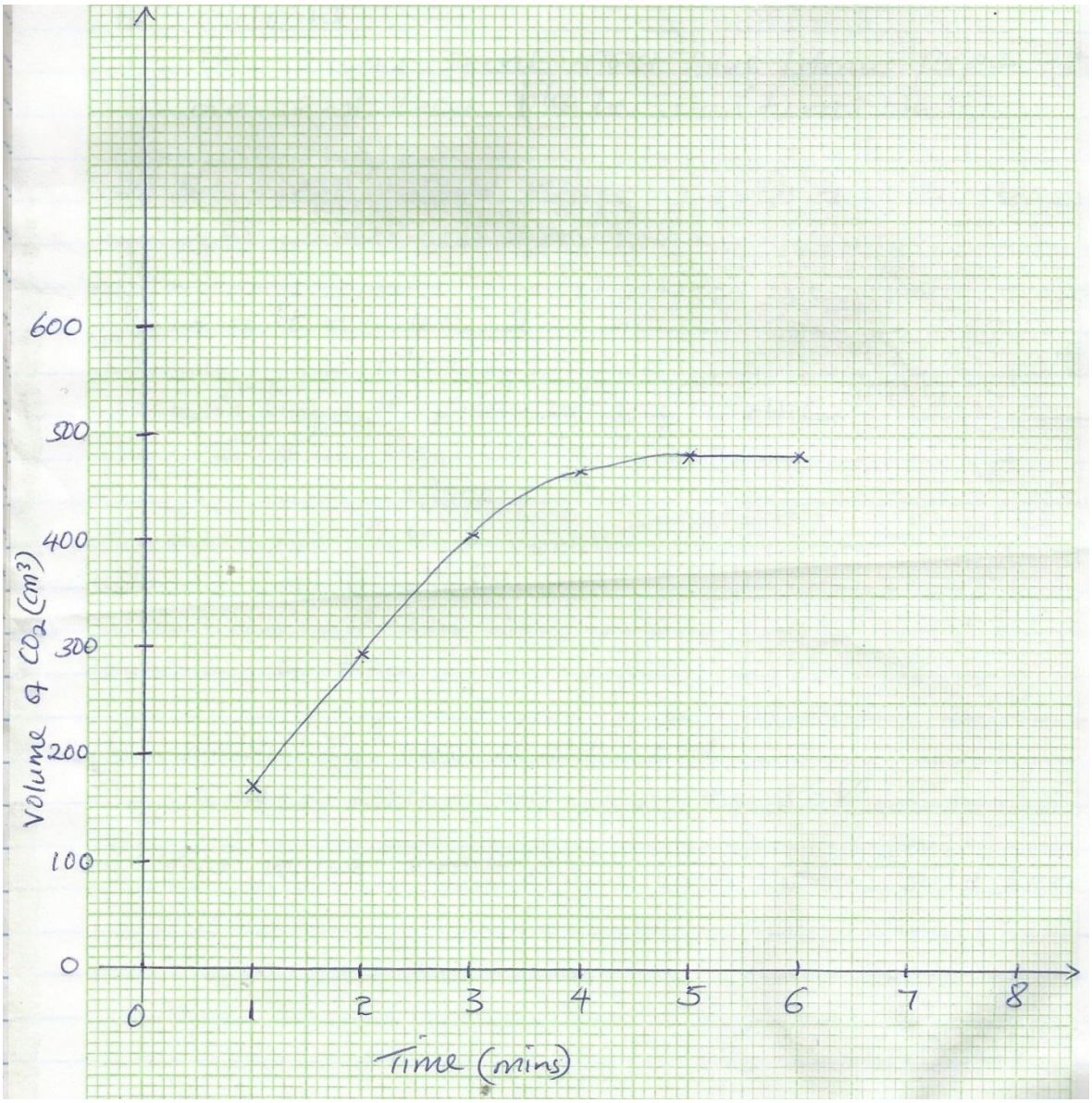
Labeling – $^1/_2$mk.

Max marks (3mks)

ii) Gradient = $\frac{550 - 420}{5.9 - 3}$

$$= \frac{130}{2.9}$$

$$= 44.83 cm^3/min$$



7. a) i) $Cu^{2+}(aq) + 2e^- \rightarrow Cu\ (s)$

ii) Chlorine.
The product turns moist blue litmus paper to red and then bleaches it (turns white)

iii) The mass would reduce this is because the copper anode would dissolve.

b) Q= It = 0.45 × 72 x 60
= 1944 C

0.6g is produced by 1944c.
59g is produced by ?

$$\frac{59 \times 1944}{0.6}$$

$$= \frac{191,160}{96500}$$

$$= +2$$

c) $Zn(s) / Zn^{2+}(aq) // Cd^{2+}{}_{(aq)} / Cd(s)$

e.m.f $= -0.4 - (-0.76) = +0.36$ V.

The positive e.m.f shows that there would be a reaction.

E N D