0715 P1 CHEMISTR GUIDE

1	A	11	C	21	C	31	A	41	C
2	C	12	C	22	B	32	C	42	D
3	C	13	D	23	C	33	D	43	D
4	D	14	A	24	D	34	B	44	B
5	D	15	C	25	B	35	D	45	C
6	A	16	A	26	B	36	A	46	A
7	C	17	A	27	B	37	C	47	A
8	D	18	D	28	A	38	B	48	A
9	B	19	A	29	A	39	B	49	D
10	A	20	D	30	C	40	C	50	C

0715 P 2

SECTION A: PHYSICAL AND GENERAL CHEMISTRY

1. (a)
(i) A molecule is a group of two or more atoms chemically bonded together. **(1 mk)**
(ii) Mass number (A) is the total number of protons and neutrons found in an atomic nucleus **(1 mk)**
(b) Number of protons = 27
Number of Neutrons = 59 – 27 = 32
(2 x ½ = 1 mk)
(c)
(i) When an electron occupies the lowest possible energy level in an atom (n = 1 level). **(1 mk)**
(ii) When an electron absorbs energy and moves to a higher energy level than its ground state (n = 2 or higher). **(1 mk)**
(d)

Species	Shape	Bond angle
SO_4^{2-}	Tetrahedral	109.5°
NH_2^-	V or bent shape	104.5°

(4 x ½ = 2 mks)
(e)
(i) - An acid is a proton donor **(1 mk)**
- A conjugate base is the species that remains after an acid donates a proton to a base. **(1 mk)**

(ii)
$pH = -\log[H^+] \Rightarrow 10.6 = -\log[H^+] \Rightarrow [H^+] = 2.51 \times 10^{-11}$ **(1 mk)**

$[H^+][OH^-] = K_w \Rightarrow [OH^-] = \frac{K_w}{[H^+]}$

$= \frac{1.0 \times 10^{-14}}{2.51 \times 10^{-11}}$ **(1 mk)**

$[OH^-] = 3.98 \times 10^{-4}$ **(1 mk)**

Alternative

$p^H + p^{OH} = 14 \Rightarrow p^{OH} = 14 - p^H$

But $P^H = 10.6 \Rightarrow p^{OH} = 14 - 10.6 = 3.4$

$P^{OH} = -\log[OH^-] \Rightarrow \log[OH^-] = -3.4$

$\Rightarrow [OH^-] = 10^{-3.4}$

$[OH^-] = 3.98 \times 10^{-4}$

(f)
(i) The enthalpy of atomization is the heat absorbed when 1 mol of a gaseous atom is formed from the element in its standard state. **(1 mk)** e.g.
$Na_{(s)} \longrightarrow Na_{(g)}$ **(1 mk)**

(ii) The standard lattice energy is the enthalpy change when 1 mol of an ionic compound is formed from its gaseous ions under standard conditions. **(1 mk)**
e.g.
$Na^+_{(g)} + Cl^-_{(g)} \longrightarrow NaCl_{(s)}$ **(1 mk) Anyone**

$Mg^{2+}_{(g)} + O^{2-}_{(g)} \longrightarrow MgO_{(s)}$

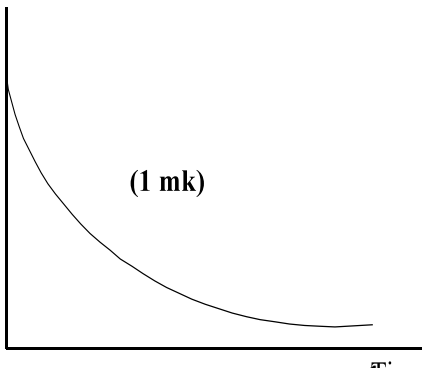
(g)
(i) The average rate of a reaction is the change in the concentration of a reactant or product per unit time. **(1 mk)**

(ii) Average rate $= \frac{\text{Change in concentration}}{\text{Change in time}} = \frac{(1-0.03)\ moldm^{-3}}{1 \times 60 \times 60\ s}$ **(1 mk)**

$= \frac{0.97\ moldm^{-3}}{3600\ s}$

$= 2.69 \times 10^{-4} moldm^{-3}s^{-1}$ **(1 mk)**

(iii)



(1 mk)

(Total = 20 marks)

2. (a)

(i) A standard solution is a solution of known concentration **(1 mk)**

(ii) From the balanced chemical equation,

$$\frac{n_{MnO_4^-}}{n_{C_2O_4^{2-}}} = \frac{M_{MnO_4^-} \times V_{MnO_4^-}}{M_{C_2O_4^{2-}} \times V_{C_2O_4^{2-}}}$$

$$\frac{2}{5} = \frac{M_{MnO_4^-} \times 18cm^3}{2.388M \times 25cm^3} \textbf{(1 mk)}$$

$$M_{MnO_4^-} = \frac{2 \times 2.388 \times 25}{5 \times 18}$$

$$= 1.327\ moldm^{-3} \textbf{(1 mk)}$$

(b)

$2dsin\theta = n\lambda$ and $n = 1$, $\lambda = 1.54Å$,

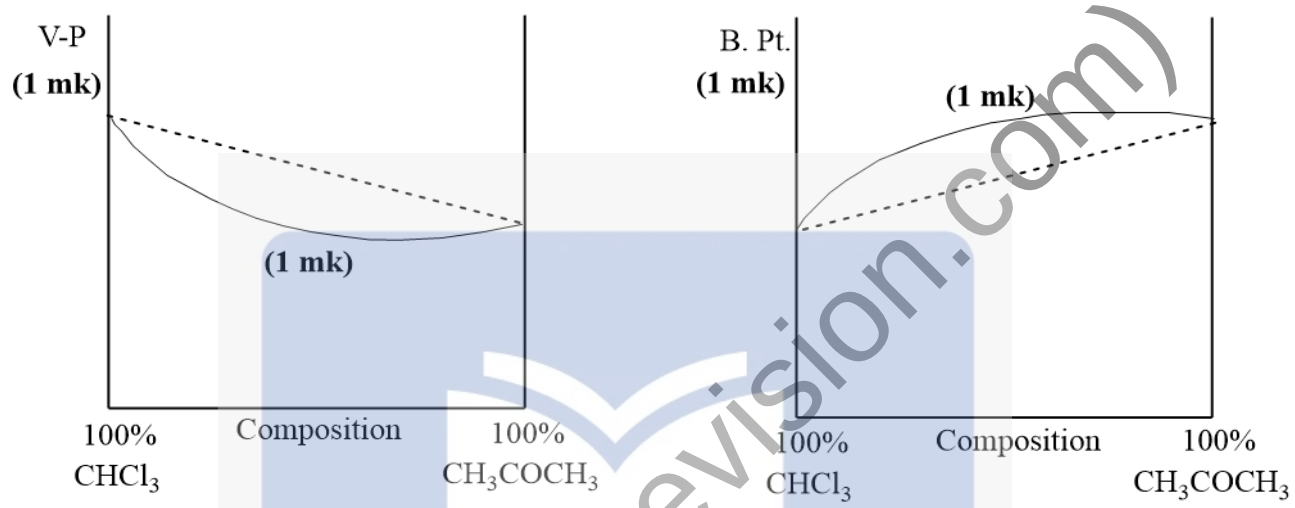
$d = 3.35Å$

$$sin\theta = \frac{n\lambda}{2d} = \frac{1 \times 1.54}{2 \times 3.35} \textbf{(1 mk)}$$

$\sin\theta = 0.2299 \Rightarrow \theta = \sin^{-1}(0.2299)$

$= 13.3°$ **(1 mk)**

(c)



(d)

(i) Dynamic equilibrium is a state in a reversible reaction where the reactants (N_2O_4) are continuously being changed to products (NO_2) and the products are continuously being converted back to reactants **(1 mk)**

(ii) The concentrations or partial pressures of N_2O_4 and NO_2 **(1 mk)**

(iii)

$$K_c = \frac{[NO_2]^2}{[N_2O_4]} \textbf{(1 mk)}$$

(iv) $[N_2O_4]_{initial} = \frac{0.1\ mol}{0.1\ dm^3} =$

$1\ moldm^{-3}$ **(1 mk)**

$N_2O_{4\,(g)} \rightleftharpoons 2NO_{2\,(g)}$		
Initial Conc	1	/
Change	$-x$	$+2x$
Eqm Conc	$1-x$	$+2x$

But $[N_2O_4]_{eqm} = \frac{0.071\ mol}{0.1\ dm^3}$

$= 0.71\ moldm^{-3}$

Thus, at eqm, $1 - x = 0.71 \Rightarrow x$

$= 1 - 0.71$

$= 0.29\ moldm^{-3}$

$[NO_2]_{eqm} = 2x = 2(0.29)$

$= 0.58\ moldm^{-3}$ **(1 mk)**

$$K_c = \frac{[NO_2]^2}{[N_2O_4]} = \frac{(0.58)^2}{0.71}$$

$= 0.474\ moldm^{-3}$ **(1 mk)**

(d)

(i) $2MnO_{4\,(aq)}^- + 5Sn_{(aq)}^{2+} + 16H_{(aq)}^+ \rightleftharpoons 2Mn_{(aq)}^{2+} + 5Sn_{(aq)}^{4+} + 8H_2O_{(l)}$ **(1 mk)**

(ii) $Pt_{(s)}/Sn_{(aq)}^{2+}, Sn_{(aq)}^{4+}//MnO_{4\,(aq)}^-, Mn_{(aq)}^{2+}, H_{(aq)}^+/Pt_{(s)}$ **(1 mk)**

(iii) The MnO_4^- half-cell will be the positive electrode (cathode). **(1 mk)**

(iii) The standard cell emf is the difference in the standard electrode potentials for the two half-cells connected together. **(1 mk)**

(iv) $E_{cell}^{\theta} = E_{cathode} - E_{anode}$

$E_{cell}^{\theta} = 1.52V - 0.15V = +1.37V$ **(1 mk)**

(Total = 20 mark)

3. (a)

(i) Periodic trend refers to the regular repeating pattern observed in the properties of elements as one moves across a period or down a group in the periodic table. **(1 mk)**

(b)

(i) These are ions that have the same number of electrons. **(1 mk)**

(ii) N^{3-}, O^{2-}, F^- **(1 mk) for any two correct**

(iii) **Trend:** Decrease across the periodic table from left to right. **(1 mk)**

Explanation: Due to the increasing nuclear charge pulling the electrons closer to the nucleus. **(1 mk)**

(c) Fluorine **(1 mk)**

(d)

(i) A diatomic molecule consists of two atoms of the same or different elements covalently bonded together. **(1 mk)**

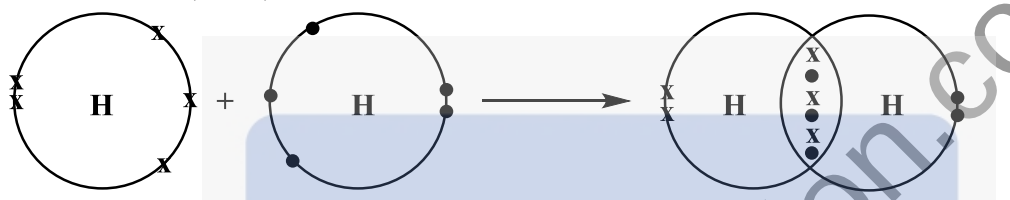
(ii) ns^2np^5**(1 mk)**

Explanation: HClO4 with a +7 oxidation state is the most thermally stable, and thermal stability decreases with decrease in oxidation state (decrease in the number of oxygen atoms) **(1 mk)** because, a higher oxidation state leads to

(e)

(i)

(1 mk) **(1 mk)**



(ii) $4NH_{3\,(g)} + 5O_{2\,(g)} \longrightarrow 4NO_{(g)} + 6H_2O_{(l)}$**(1 mk)**

$2NO_{(g)} + O_{2\,(g)} \longrightarrow 2NO_{2\,(g)}$**(1 mk)**

(iii) $Br_{2\,(l)} + 2NaOH_{(aq)} \longrightarrow NaBr_{(aq)} + NaBrO_{(aq)} + H_2O_{(l)}$**(1 mk)**

(iv) **Type of Reaction:** Disproportionation reaction **(1 mk)**

Definition: A disproportionation reaction is a reaction in which a given species is simultaneously reduced and oxidized in the same reaction to produce two different products. **(1 mk)**

(v) $HClO_4 > HClO_3 > HClO_2 > HClO$**(1 mk)** more positive charges on the Chlorine atom which enhances the attraction between the chlorine atom and oxygen atoms resulting in a stronger bond length. **(1 mk)**

$4NO_{2\,(g)} + O_{2\,(g)} + 2H_2O_{(l)} \longrightarrow 4HNO_{3\,(aq)}$**(1 mk)**

(iii) Production of fertilizer, explosives, drugs**(1 mk)**

for anyone (Total = 20 marks)

4. (a)

(i) K= $1s^22s^22p^63s^23p^64s^1$**(1 mk)** or $[Ar]4s^1$

$Ca^{2+} = 1s^22s^22p^63s^23p^6$**(1 mk)**

(ii) In the same period, the boiling points of group 2 metals are higher than those of group 1 metals due to increase in the metallic bond strength which increase with the number of valence electrons. **(1 mk)**

(iii) **Trend**

For group 1, solubility of metal sulphate increases down the group **(1 mk)**

For group 2, solubility of metal sulphate decreases down the group **(1 mk)**

Explanation

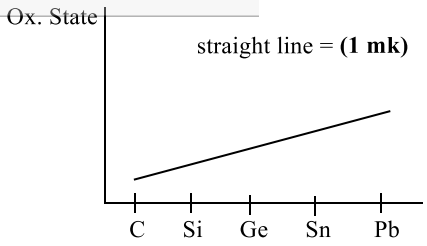
For group 1, solubility increases down the group is due to decrease in lattice energy (increase in hydration energy), while in group 2, decrease in the solubility of the metal sulphatedown the group is due to increase in lattice energy (decease in hydration energy). **(1 mk)**

(iv) Group 2 metal hydroxides are less soluble than group 1 metal hydroxides because, group 2 metal cations are larger and have a higher charge density than group 1 metal cations **(1 mk)** leading to higher lattice energy in group 2 compare to group 1 **(1 mk)**

(b)

(i) The Inert Pair Effect is the reluctance of the outer s-electrons of the lower members of group 4 elements to participate in bonding by remaining paired.**(1 mk)**

(ii)



(iii) The above trend is due to the inert pair effect as only the two outer p-electrons are involved in bonding while the s-electrons remained paired **(1 mk)**

(iv) $CCl_4 + H_2O \longrightarrow$ No Reaction

$SiCl_{4\,(l)} + 2H_2O_{(l)} \longrightarrow SiO_{2\,(s)} + 4HCl_{(aq)}$

(2 x ½ = 1 mk)

(c)

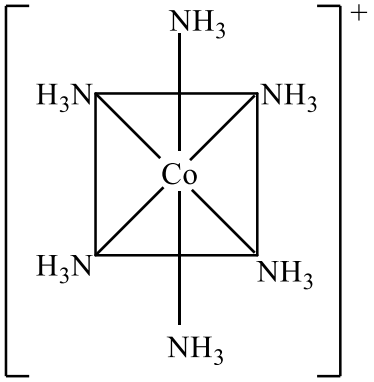
(i) Scandium (Sc) and zinc (Zn) are not considered as transition metal because the stable ion of scandium (Sc^{3+}) has an empty d-subshell **(1 mk)**when it loses its electrons while Zn^{2+}has a fully filled d-subshell ($3d^{10}$).**(1 mk)**

(d)

(i) A monodentate ligand is one that can form one coordinate bond with a central metal atom or ion through a single donor atom having one pair of electron. **(1 mk)**

(ii) Hexamminecobalt (III) ion**(1 mk)**

(iii)

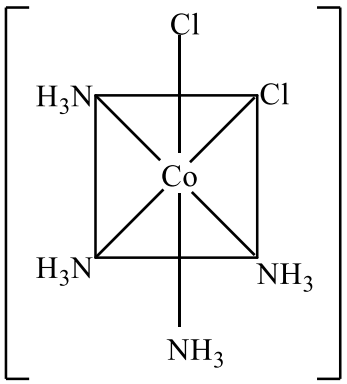


(1 mk)

(e)

(i) Tetraamminedichlorocobalt (III) ion **(1 mk)**

(ii)



(1 mk)

cis

5. (a)

(i) Compound C: $CH_3CH_2NH_2$ **(1 mk)** ethylamine **(1 mk)**

Compound I: CH_3NH_2 **(1 mk)** Methylamine **(1 mk)**

(ii)

Steps	Reagents	Reaction Conditions
(i)	HBr	Room temperature
(ii)	KCN/ethanol	Reflux
(iii)	OH^-/H_2O	Reflux
(iv)	$H^+/Cr_2O_7^{2-}$	Heat
(v)	NH_3	Heat

(10 x ½ = 5 mks)

(b)

(i) C_6H_5OH and $C_6H_5CH_2OH$

Use Neutral iron (III) chloride **(1 mk)**

When Neutral iron (III) chloride is added to both solutions, C_6H_5OH produces a violet colouration **(1 mk)** while $C_6H_5CH_2OH$ does not produce a colour change. **(1 mk)**

(ii) $CH_3CH_2NH_2$ and CH_3CONH_2

Use aqueous NaOH/heat **(1 mk)**

CH_3CONH_2 when heated with aqueous NaOH produces NH_3 gas with a strong suffocating odour (pungent smell) **(1 mk)** while $CH_3CH_2NH_2$ will not produce NH_3 gas under these conditions **(1 mk)**

(iii) CH_3COCH_3 and $CH_3CO_2CH_3$

Use I2/NaOH **(1 mk)**

When CH_3COCH_3 forms a yellow precipitate of triiodomethane (iodoform) with an antiseptic smell **(1 mk)** while $CH_3CO_2CH_3$ will not **(1 mk)**

(Total = 20 marks)

6. (a)

(i) CH_3COOH **(1 mk)** and CH_3OH **(1 mk)**

(ii) $CH_3CH_2NH_2$ **(1 mk)** and CH_3COOH **(1 mk)** or CH_3COCl

(b)

(i) dimethylamine **(1 mk)**

(ii) phenylmethylamine **(1 mk)**

(iii) methylphenylamine **(1 mk)**

(iv) phenylamine **(1 mk)**

(c) Phenylamine is a weaker base **(1 mk)** due to the electron withdrawing effect of the phenyl group in phenylamine **(1 mk)** which decreases the electron density on the N atom making it a weaker base. **(1 mk)**

(d)

(i) **Reagent:** OH^-/H_2O **(1/2 mk)**

Reaction condition: reflux **(1/2 mk)**

(ii) **Reagent:** OH^-/C_2H_5OH **(1/2 mk)**

Reaction condition: reflux **(1/2 mk)**

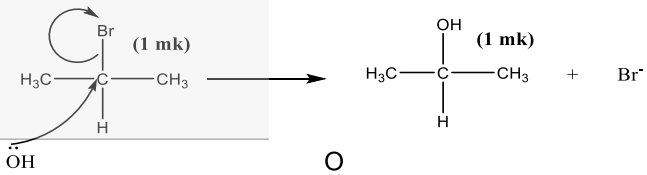
(4 x ½ = 2 mks)

(iii) **Type of reaction mechanism:** Elimination (E2) mechanism **(1 mk)**

Role of the reagent: OH^- acts as a base **(1 mk)**

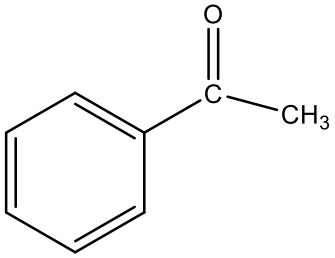
(iii) Both conversions involve gently heating the ethanol in $H^+/Cr_2O_7^{2-}$ **(1 mk)**. For the E to F conversion, the ethanal (CH_3CHO) is distilled out as it forms, while for the E to G conversion, the ethanoic acid (CH_3COOH) can be formed by refluxing ethanol in excess $H^+/Cr_2O_7^{2-}$. **(1 mk)**

(iv)



(e)

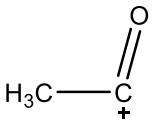
(i)



(1 mk)

(ii) **Name of organic reaction mechanism:** Electrophilic (aromatic) substitution **(1 mk)**

Structure of electrophilic reagent:



(1 mk)

(Total = 20 marks

0515 P2 CHEMISTRY

USEFUL DATA

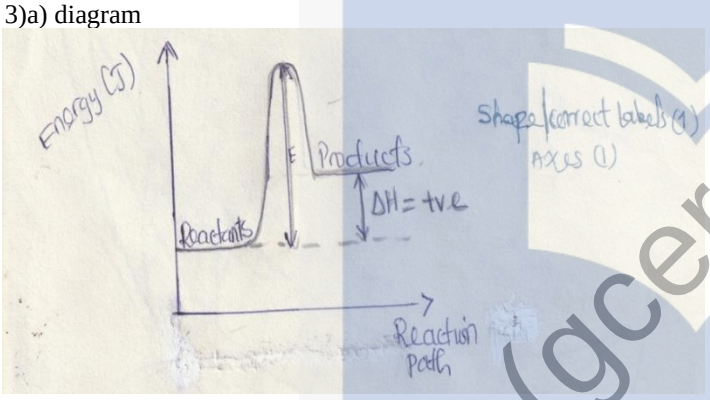
RAM C= 12, O=16, Na= 23

SECTION A

A = 11 (1)
B = 12 (1)
C = 7 (1)
D = 10 (1)
E = 24 (1)
F = 10 (1)

I. Cation is Z^{2+} (1)
Anion is Y^{3-} (1)
ii. Z_3Y_2 (1)
iii. Ionic bond (1)
TOTAL = 10MARKS

2) a) Halogens (1)
b) I<Br<Cl<F or I,Br,Cl,F (1)
c) Bromine (1) or Br_2 or Br
d) I. One made up of two atoms of the same kind(1) linked together by a covalent bond
ii. F_2 (1)
iii. Oxygen, Hydrogen, Nitrogen (1) for any
e) i. $2KBr + Cl_2 \longrightarrow 2KCl + Br_2$ (2)for balanced equation
ii. $NaCl + Br_2 \longrightarrow$ No reaction (1)
f) Chlorine (1)
3)a) diagram



b) i. Heat evolved when one mole of a substance is completely burnt in Oxygen (1)
ii. Mass of ethanol burnt = 35.56 – 34.56g (1) = 1g (1)
iii. 1g of ethanol release 29.7kJ/mol
therefore, 46g of ethanol will release 46 x 29.7/1 (1) = 1366.2kJ/mol(1)

c) I. Salt P is deliquescent (1)
Salt Q is hygroscopic (1)
ii. - Blue turns white (1)
-Water condenses at the cooler end of tube
- Salt becomes powder
- Crystal shape crumbles Total = 10marks

4) a) but -2- ene(1)
b) i. Addition reaction(1)
ii. $CH_3CH_2CHBrCH_3$(1)
iii. 2- bromobutane(1)
iv. Existence of two or more compounds with same molecular formula(1) but different structural formulae.(1)
v. $CH_3CH_2CH_2CH_2Br$ or $CH_3CH(CH_3)CH_2Br$ (1) for any
c) butane(1) or(cyclobutane) or 2methylpropane
d) i. cracking (1)
ii. –To produce extra petrol or gasoline of high quality.(1)
- A source of alkanes. Total 10marks

5) a) U = Sulphur(1)
V = Oxygen(1)
b) Sulphurdioxide or SO_2(1)

c) i. $2SO_2 + O_2 \longleftrightarrow 2SO_3$ (1)

ii. Venadium (V)oxide (1)

d) oleum (or formula)(1)

e) I. carbon monoxide or CO (1)

ii. –It is poisonous (1)

- denser than air.

iii. –used as a reducing agent in the extraction of metals. (1)

-An important constituent of gaseous fuels like producer gas and water gas . Total 10 marks

SECTION C

a) i) Dip a clean nichrome wire or pencil lead into conc. HCl (1),touch against sample to pick grains of salt(1) and introduce to Bunsen flame.(1)

ii) presence of Cu^{2+}(1)

iii) observation

-white precipitate formed (1), which is soluble in excess ammonia.(1).

Iv) $CuCl_2$ or copper (II) chloride(1).

b) i) Cation

Procedure

-Dissolve salt (1) sample with distilled water

- To 2 cm^3 of the solution in a test tube, add 2 drops of aq. NaOH (1), then in excess.

Observation

- Dirty green gelatinous precipitate (1) formed, insoluble in excess NaOH

Ii) Anion. Either;

Procedure1

-To 2cm^3 of the salt solution ,add freshly prepared iron (ii) sulphate (1) and shake well followed by concentrated sulphuric acid on the walls of the test tube without shaking (1).

Observation: Brown ring (1) is seen at the junction of the two layers.

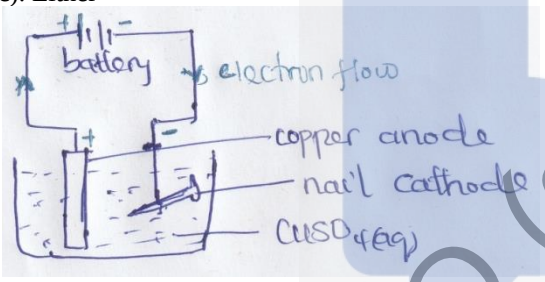
OR

Procedure 2

Heat (1) the solid sample in a dry test tube and test the gas given off with a glowing splint and damp litmus. (1)

Observation: Brown gas evolved which turns moist litmus paper red (1).

c). Either



Correct set up = 1 mark

Correct electrodes = 2 marks

Solution = 1 mark

4MARKS

OR

Copper is made the anode (1)

Nail is made the cathode (1)

Connect to d.c supply and (1) and immerse the electrodes in an electrolyte ($CuSO_{4(aq)}$) (1)

NB. Electrolyte can be any other soluble copper salt

e) i) Thermometer (1)

Ii) Scale balance(1)

Iii) Gas mask (1)

TOTAL 20 MARKS

A) Solution whose concentration is known (1)

b) i) molarity x volume (dm^3) x molar mass = mass = 0.2 x 0.25x 106 = 5.3g (2)

Ii) Weigh accurately 5.3g of Na2CO3 (1 mark) in a clean dry beaker. Dissolve the weighted mass with distilled water (1) and carefully transfer all the solutioninto a 250cm^3volumetric flask and top it to the the mark (1) , stopper the flask firmly and shake well(1).

Iii) To determine the concentration of another solution(1)

c) i) $Na_2CO_3 + H_2SO_4 \longrightarrow Na_2SO_4 + CO_2 + H_2O$ (2)

Ii) MaVa / MbVb=1/1 , Ma = MbVb /(Va) = 0.2 x25 /(20) (1) = 0.25M (1)

Iii) To determine the endpoint (1)

IV) indicator : methyl orange (1)

Colourchange : yellow(1) to pink (1)

d) i) filtration (1)

Ii) residue (1)

Filtrate (1)

Iii) tea/tealeaves , muddy water, chalk in water)(1 mark for any)

TOTAL 20 MARKS

SECTION C

Summary: definition (1 mark)

: Example 1 x 3 (3 marks)

: property 1 x 3 = 3 marks

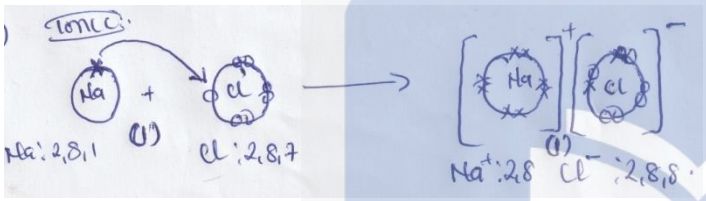
: Description; ionic = 5marks, covalent = 5 marks, metallic = 3 marks

a) A chemical bond is a strong force of attraction between atoms or ions in a substance (1)

b) Ionic bond: Example NaCl (1)

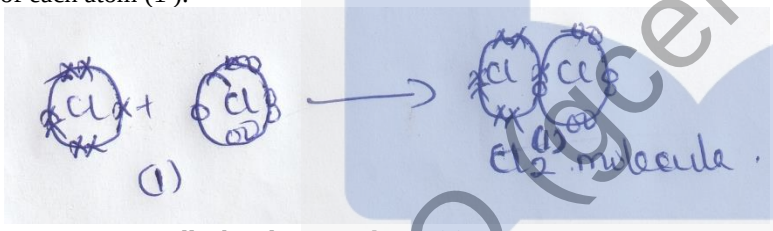
During the formation of ionic bond, there is a transfer of one valence electron (1) from the valence shell of sodium to the valence shell of chlorine (1).

Na^+ and Cl^- (1) are formed. The force of attraction between Na^+ and Cl^- constitutes an ionic bond (1).



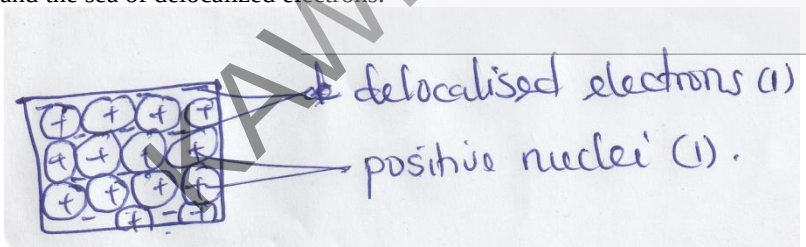
Simple covalent: Example Cl_2(1)

During bond formation the two chlorine atoms each donates one electron (1) for sharing. The electron pair is shared by both atoms (1) forming a molecule. The covalent bond is the attraction between shared pair of electrons and the positive nuclei of each atom (1).



Metallic bond: Example Cu (1)

Each copper atom loses two valence electrons which fall into inter atomic cavities forming a sea of delocalized (1) electrons. This leaves behind positively charged residual atomic nuclei. The metallic bond is the force of attraction between the positive nuclei and the sea of delocalized electrons.



C) NaCl - conduct electricity when molten or in solution because of free mobile ions (1)
- They are solids because of strong forces of attraction between them.
- High melting and boiling points because of strong forces of attraction.

Cl_2 - $Cl_2$is a gas at room temperature because of weak forces that exist between chlorine molecules. (1)

Cu - Good conductor of electricity because of free mobile delocalized electrons (1)

9) Identification - 1 x 3= 3

Reagents - 2 x3= 6

Method of collection 1 x 3= 3
Drying agent 1x3=3
Equations 1x3 = 3

i) Sulphur dioxide or SO_2(1): Place some Na_2SO_3(1) or K_2SO_3 in a round bottomed flask, add dilute HCl (1) using a thistle funnel and heat. Effervescence occurs and gas produced is passed over conc. Sulphuric acid to dry(1) and is collected by downward delivery(1)in a gas jar since the gas is denser than air.

$Na_2SO_3 + 2\ HCl \longrightarrow 2NaCl + H_2O + SO_2$ (1)

ii) Oxygen (1) : Mix 4g of $KClO_3$ (1)and 1g of MnO_2(1) catalyst and grind, place in a boiling tube and heat. The oxygen gas produced is passed over conc. Sulphuric acid in a bottle orfused calcium chloride in a u-tube to dry it(1). Collect the gas over mercury or gas syringe .(1) $2KClO_3 \longrightarrow 2KCl + 3O_2$ (1)

iii) Hydrogen (1) : prepared by the reaction of zinc granules (1) with dilute hydrochloric acid (1) (any acid) . Using a thistle funnel add dilute HCl into flat bottomed flask containing some zinc granules. Effervescence occurs and the gas produced is passed through fused calcium chloride(1) or conc.sulphuric acid to dry it. Gas is then collected by upward delivery (1) since it is lighter than air .

$Zn + 2\ HCl \longrightarrow ZnCl_2 + H_2$ (1)
A graduated gas syringe.(2) TOTAL = 20 MARKS

10. summary;
type of reaction (1)
Reagent(1)
Product (1)
Reaction condition (1)
Equation (1)

$CH_3CH_2OH \longrightarrow C_2H_4$
This is a dehydration reaction (1).
Ethanol (1) reacts with excess conc. Sulphuric acid at 180°C (1) to produce ethene (1).

$C_2H_5OH \longrightarrow C_2H_4 + H_2O$ (1)

b) $CH_2CH_2 \longrightarrow (CH_2CH_2CH_2CH_2)_n$
This is an addition polymerization reaction (1).
Many ethene molecules (1) called monomers are heated at high temperature and pressure in presence of traces of oxygen as catalyst (1) to yield a large molecule of polythene (polymers) (1) .
$2nCH_2CH_2 \longrightarrow (CH_2CH_2CH_2CH_2)_n$ (1)
C Fe $\longrightarrow Fe^{3+}$
This is an oxidation reaction (1).
Chlorine gas (1) is passed over heated iron (1) in a combustion tube to form iron (iii) chloride .(1)
$2Fe + 3Cl_2 \longrightarrow 2FeCl_3$ (1)

$Br_2 \longrightarrow Br^-$
Reduction Reaction
Bromine (1) reacts readily (1) when added to a solution of potassium iodide in a test tube. Potassium bromide and Iodine formed. (1)

$2KI + Br_2 \longrightarrow 2KBr + I_2$(1) TOTAL 20 MARKS