1. a) i J_2M √1

ii) K is more√1 reactive than N because K has smaller nuclear√1 attraction than N/0 N is less reactive than K. N has large nuclear attraction than K. 2

iii) K has larger√1 atomic size than O. Electron to proton repulsion is lesser in K than in O. K has smaller nuclear attraction than O. 2

b) Ionic.√½ ½

c) i) Decrease in reactivity due to difficulty to loss outer electrons.√1 1

ii) Increase in reactivity due to ease to gain electrons.√1

I i) TCl_3 √1

ii) UO_2 √1

iii) V_2O_5 √

II R - Ionic bond√½ ½

U - Covalent bond√½ ½

III i) The Chloride of U forms a simple molecular structure√1 with lower melting point while its Oxide forms a giant atomic structure√1 with higher melting point. 2

ii) Chloride of T sublimes.√1

2. a) F – Lead II Nitrate√1

G – Nitrogen IV Oxide√1

H – Oxygen gas.√1

M- Lead II Oxide√1

J - Lead II Nitrate solution √1

5 Penalize if formular

b) Thermal decomposition.√1

c) $2Pb(NO_3)_{2(s)} \xrightarrow{Heat} 2PbO_{(s)} + 4NO_{2(g)} + O_{2(g)}$

d) Pass the gas on moist √½blue litmus paper. The blue litmus paper turns from blue to red.√½

e) $PbO_{(s)} + 2HNO_{3(aq)} \rightarrow Pb(NO_3)_2 + H_2O_{(l)}$ √1

f) Solution K.....Nitric (V) acid√½ ½ Insoluble salt Lead (II) Sulphate√½ ½

g) Add√1 excess Copper to Nitric (V) acid. Filter√½ to obtain the filtrate of Copper II Nitrate Add excess √½Ammonium Sodium /Potassium Carbonate to the filtrate to obtain √½the residue of Copper (II0 Carbonate. Wash with distilled water, dry between filter paper

3. a) E - Anode √½

F - Cathode √½ ½

b) E - Red/brown gas √1 ½

F - Grey solid√1

c) E - $2Br^-_{(aq)} \xrightarrow{oxidation} Br_{2(g)} + 2e^-$ √1

F - $Pb^{2+}_{(aq)} + 2e^- \xrightarrow{Reduction} Pb_{(s)}$ √1

e) Ions become localised√½

due to resolidification √½of PbBr2. 1

f) Electolysis.√1 1

g) Prevent rusting/corrosion √

4. i) J – Propan-l-ol √1 1

L -2-Chloroprop-l-ene √1 1

(ii) Concentrated sulphuric VI acid. √1

Heat (160^0C-180^0C) √1 2

(iii) Reagent - Hydrogen gas√1

1 Condition - 180-2000C √1

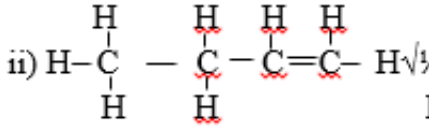
1 -Nickel catalyst√1

1 -Packaging papers

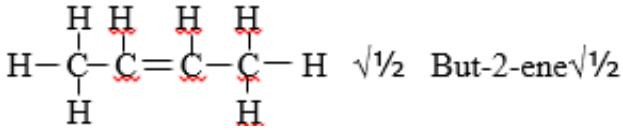
1 (iv) Making rain coat Insulators Electric cables

1 Square bottles/wash bottles/toys

(v) i) Are compounds with the same molecular formula but different structural formula

ii)  √½

But-1-ene√½

 √½ But-2-ene√½

5. a) i) Concentrated sulphuricVI acid√1 1

ii) Potassium Nitrate √1 1

b) i) Nitric (V) acid is a stronger oxidizing agent√½.

It will corrode/react/attract rubber√½. 1

ii) Nitric (V) acid is reduced to Nitrogen II Oxide√½ gas (colourless)√½.

The gas in open is oxidized by oxygen to Nitrogen√½ IV Oxide (brown gas)√½ 2

c) i) Water/steam/cracking of alkanes√/natural gas√ crude oil/water gas (CO+$H_{2)}$/Biogas petroleum /etc. any two (2 marks) 2

ii) Electrolysis of dilute NaCl

$$NH_{3(aq)} + HNO_{3(aq)} \rightarrow NH_4NO_{3(aq)} \surd 1$$

$$\left(\frac{3200kg \times 17kg}{80kg}\right) = 680kg$$

iii) -Explosive/hence use in production of TNT. -Production of polymers (e.g. terylene) plastics/dyes. -Oxidizing agent. -Purification of gold or platinum/manufacture of roya/ water. (any two=2 marks) 2 6

6.

$MgO = 20.92 - 19.52 = 1.4g$

$Mass\ of\ oxygen = 1.4 - 0.84 = 0.56g$

$\%\ of\ oxygen\ in\ MgO = \frac{0.56}{1.4} \times 100 = 40\%\ \surd 1$

$Mg\ in\ MgO = \frac{0.84}{1.4} \times 100 = 60\%\ \surd 1$

Mg	:	O
$\frac{60}{24}\ \surd ½$:		$\frac{40}{16}\ \surd ½$
$\frac{2.5}{2.5}$	:	$\frac{2.5}{2.5}\ \surd ½$

$MgO \Rightarrow MgO\ \surd ½$

b) i) Answer

$R\alpha \frac{\sqrt{R.F.M\ O_2}}{\sqrt{R.F.M\ SO_2}}$

$\frac{\frac{200}{60}}{\frac{300}{T}} = \frac{\sqrt{32}}{\sqrt{64}}\ \surd 1$

$\frac{3.333}{\frac{300}{T}} = \frac{5.66}{8}\ \surd 1$

$\frac{300}{T} \times \frac{5.66}{1} = 3.333 \times 8$

$T \times \frac{1698}{T} = 26.664T$

$\frac{1698}{26.664} = \frac{26.664}{26.664}\ \surd ½$

$63.68\ seconds\ \surd ½$

---

7. A)i) Grey solid turns to green. Iron is oxidized by hydrogen chloride gas to iron II chloride which is green.√ 2

ii) Iron III Chloride√ (accept correct formular)/ $FeCl_3$ 1

iii) It sublimes √1 and hydrolyses in the presence of water.(any one property 1 mark) 1

iv) To keep solid R dry.√1 1

v) Manganese IV Oxide and concentrated hydrochloric acid √1 (both must be correct.1

vi) It would form and then hydrolyse to a solution containing hydrochloric acid. Hence not collected

as a sublimate. 1

vii) A part from drying √½ the gas it also absorbs √½ excess chlorine gas which is poisonous if left to escape. 1 B)

i) Yellow deposit.√1 Chlorine gas oxidizes hydrogen sulphide to sulphur which is yellow√1.

ii) $\underset{\text{coloured}}{dye + HOCl_{(aq)}} \rightarrow \underset{\text{white}}{(dye + O) + HCl_{(aq)}}$