

FORM 3 CHEMISTRY PAPER 1
END OF TERM II MARKING SCHEME

- 1 Sulphur
Phosphorus Any two, 1mk each.
Carbon
Nitrogen

2 (a) T - 2.7 (1/2 mk)
V - 2.8.1 (1/2 mk)

(b) Ionic bonding (1mk)

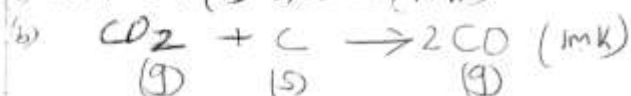
3 $\begin{matrix} S & R & P & Q \\ \hline & \text{decreasing} & & \end{matrix}$ reactivity. All correct - 1mk.
Last and first correct - 1mk

4

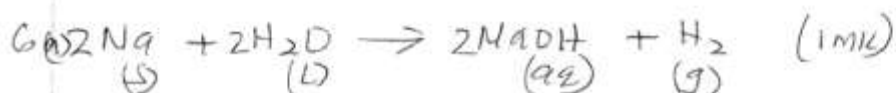
	Al_2O_3	H_2O	
i mass	20.6	7.8	1/2 mk
ii R.F.M	102	18	
iii No of moles	$\frac{20.6}{102}$	$\frac{7.8}{18}$	1/2 mk
	0.2019	0.4	1/2 mk
iv Divide by the smaller	$\frac{0.2019}{0.2019}$	$\frac{0.4}{0.2019}$	1/2

$Al_2O_3 : H_2O$
1 : 1.98
1 : 2
 $x = 2$ 1mk

5 (a) Carbon (ii) oxide (1mk)



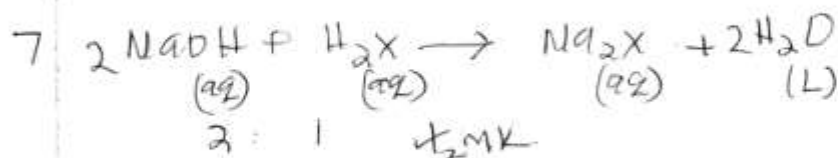
(c) Carbon (ii) oxide is poisonous (1mk)



Unbalanced equation - 0mk.

wrong) missing state symbols - 1/2 mk penalty

- (b) red litmus turns blue, blue litmus remains blue since the solution formed (NaOH) is alkaline (mk)



MOLARITY of NaOH = $\frac{4}{40} = 0.1 \text{ M}$ (mk)

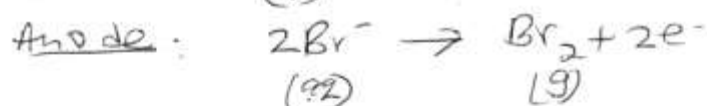
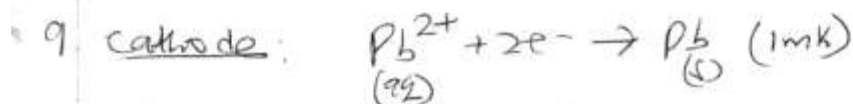
MOLES of NaOH = $\frac{0.1 \times 22.2}{1000} = 0.00222 \text{ moles}$ (mk)

MOLES of $\text{H}_2\text{X} = \frac{1}{2} \times 0.00222 = 0.00111 \text{ moles}$ (mk)

$0.00111 \text{ moles} \rightarrow 0.1 \text{ g}$
 $1 \text{ mole} \rightarrow \frac{0.1 \times 1}{0.00111} = 90.00 \text{ g (mk)}$

- 8(a) N - sodium ethanoate (CH_3COONa) (mk)
 P - methane (CH_4) (mk)

- (b) substitution (mk)



10

$$\frac{R_1}{R_2} = \frac{\sqrt{m_2}}{\sqrt{m_1}}$$

$$\frac{R_P}{R_Q} = \frac{\sqrt{m_Q}}{\sqrt{m_P}}$$

$$\frac{12}{7.2} = \frac{\sqrt{m_Q}}{\sqrt{16}} \text{ (mk)}$$

$$12 \times 4 = 7.2 \times \sqrt{m_Q} \text{ (mk)}$$

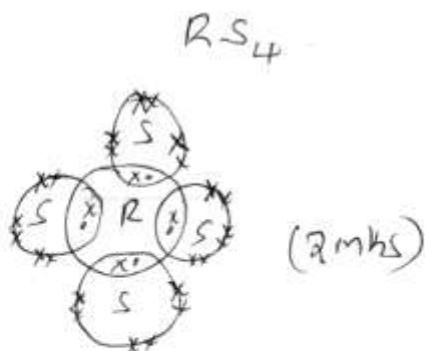
$$48 = 7.2 \times \sqrt{m_Q}$$

$$\sqrt{m_Q} = \frac{48}{7.2}$$

$$\sqrt{m_Q} = 6.66$$

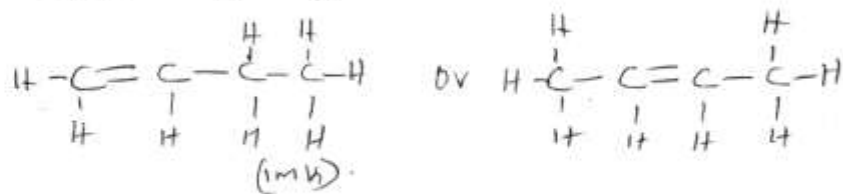
$$m_Q = 44.44 \text{ g (mk)}$$

11 $R = 2.4$
 $S = 2.7$



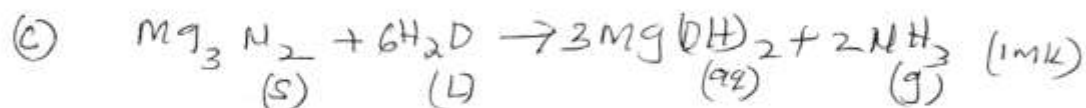
(b) The solution turned to pink (1mk) since solution IV is a strong alkali (1mk)

13 (i) Butene (1mk)

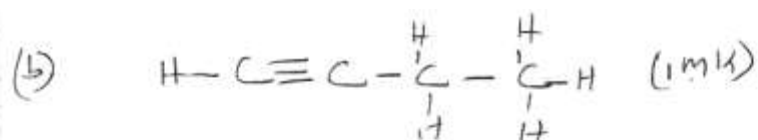


(ii) Purple acidified potassium manganate (VII) is decolourised (1mk) due to presence of a double bond.

14 (a) solid Q - Magnesium nitride (Mg_3N_2) (1mk)
 solid P - magnesium oxide (MgO) (1mk)



$$\begin{array}{l|l} \text{E.F} = \text{C}_2\text{H}_3 & \text{M.F} = (\text{C}_2\text{H}_3) \times 2 \\ n = \frac{54}{27} = 2 & = \text{C}_4\text{H}_6 \quad (1\frac{1}{2}\text{mk}) \\ \text{(1/2mk)} & \end{array}$$



(c) Alkynes (1mk)

16 (i) Hygroscopy (1mk)

(ii) Deliquescence (1mk)

(iii) Efflorescence (1mk)

17

$$\frac{P_1 V_1}{P_2 V_2} = \frac{P_1}{P_2} = \frac{P_2 V_2}{P_1 V_1}$$

$$4 \times 152 = P_2 \times 1.5 \quad (1\text{mk})$$

$$P_2 = \frac{4 \times 152}{1.5} = 405.33 \text{ mmHg} \quad (1\text{mk})$$

18 (a) P — Lead carbonate / PbCO_3 (1mk)

Y — Lead (II) oxide / PbO (1mk)



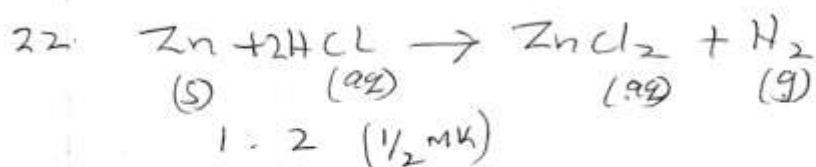
19 React PbCO_3 with dilute nitric (v) acid (1mk) to form Lead nitrate solution. React Lead nitrate solution with a soluble chloride or dilute HCl (1mk) to form Lead chloride. Filter out (1/2mk) Lead chloride and dry it (1/2mk) in between filter papers.

20 (a) Nonmetals (1mk) The ionic radius is greater than the atomic radius (1mk)

(b) Z (1/2mk) It has the smallest atomic radius (1/2mk) hence can easily gain an electron.

21 (a) They contain delocalised electrons (1mk)

(b) it is light (1mk each)
it does not corrode easily (1mk)



$$\text{moles of HCl} = \frac{1 \times 1100}{1000} = 1.1 \text{ moles } (1/2 \text{mk})$$

$$\text{mole ratio, HCl} : \text{H}_2 \\ 2 : 1$$

$$\text{moles of H}_2 = \frac{1}{2} \times 1.1 = 0.55 \text{ moles } (1/2 \text{mk})$$

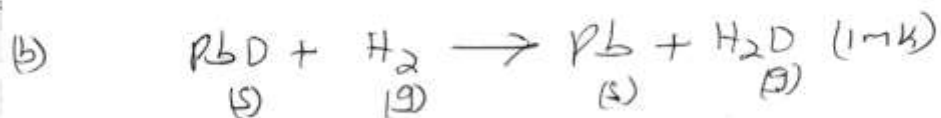
$$\begin{aligned} \text{Volume of H}_2 &= 0.55 \times 24 \text{ L} \\ &= 13.2 \text{ L } (1/2 \text{mk}) \end{aligned}$$

23 (a) P is more reactive with bromine than Q since it has a greater atomic radius (1/2mk)

(b) Q = 12
P ~~has~~ has one more energy level (1mk) since its below Q. Hence its atomic number

$$2.8.8.2 \\ = 20(\text{mk})$$

24 (a) white anhydrous copper(II) sulphate turns to blue (mk)



(c) A grey ^(mk) solid is observed. The colour of the solid changes from yellow to grey

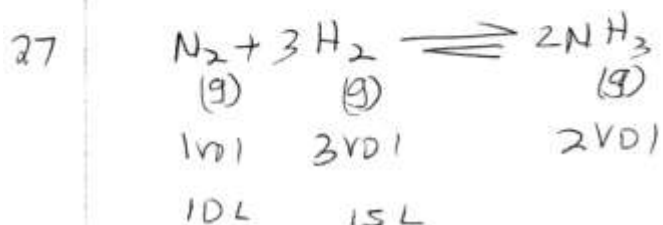
25 (a) Rusting is a chemical change (mk) since the reaction is irreversible (mk) // Forms a new product.

- (b) - Electroplating
- Alloying
- Painting
- Diling and greasing

Any one mk

26 (a) PbCO_3 reacts with sulphuric(VI) acid forming insoluble lead sulphate (mk) which hinders further reaction (mk)

(b) Nitric (V) acid (mk)



(a) 15 L of H_2 requires $15 \times \frac{1}{3}$ L of N_2
 $= 5 \text{ L (1mk)}$

Hence $\frac{N_2}{(1mk)}$ was in excess

(b) Volume of ammonia gas

1 volume = 5 L

2 volumes = 5×2 (1/2 mk)
 $= 10 \text{ L (1/2 mk)}$

28 (a) Oxygen gas (1mk)

(b) Thermal decomposition (1mk)

29 E - Giant ionic structure (1mk)

F - Giant metallic structure (1mk)

30 - ~~Pres~~ - storage of semen for artificial insemination.

- Filling empty oil tankers to prevent an explosion.

- manufacture of ammonia.