

Cambridge University Examinations

General Certificate of Education Ordinary Level
O – LEVEL 5070. Notes, P1, P2 and P4

Teacher: - Mubashir Sulehri

Chapter

FORMULAE and EQUATIONS

Work Sheet Paper 2

Mubashir Sulehri

03224307040

Lahore Grammar School
Roots International School
Lahore Learning Campus
Bloomfield Hall School

- 1 A sample of a compound of iron is analysed. The sample contains 0.547 g of potassium, 0.195 g of iron, 0.252 g of carbon and 0.294 g of nitrogen. Calculate the empirical formula of this compound.

Answer[3]

- 2 Complete the following table giving the name or the formula of each compound as appropriate.

	Chemical name	Chemical formula
(a)	potassium chloride	
(b)		SO ₂
(c)		Mg(NO ₃) ₂
(d)	methanol	
(e)		FeBr ₂
(f)	aluminium sulphate	

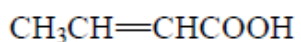
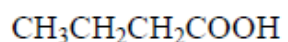
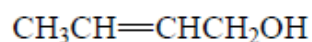
- 3 Calculate the mass of magnesium in 150g of magnesium carbonate MgCO₃.

4

Name of compound	Formula of compound	Formula of cation	Formula of anion
magnesium chloride	MgCl ₂	Mg ²⁺	Cl ⁻
lead(II) nitrate		Pb ²⁺	
aluminium sulphate		Al ³⁺	SO ₄ ²⁻
manganese(III) oxide	Mn ₂ O ₃		O ²⁻
calcium phosphate	Ca ₃ (PO ₄) ₂		

5

This question refers to the three organic compounds labelled A, B and C below.

Compound A**Compound B****Compound C**

(a) Which one of the compounds has a relative molecular mass of 86?

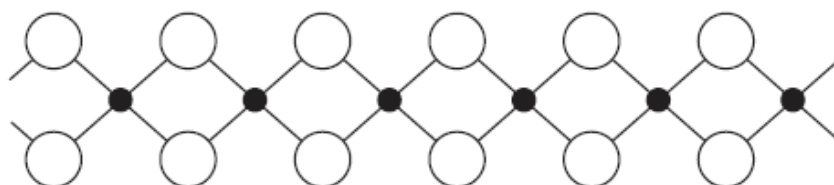
.....

6

Calculate the mass of water in 100 g of Copper sulphate crystal CuSO₄·5H₂O

7

(c) Part of the structure of palladium chloride is shown below.



● palladium, Pd

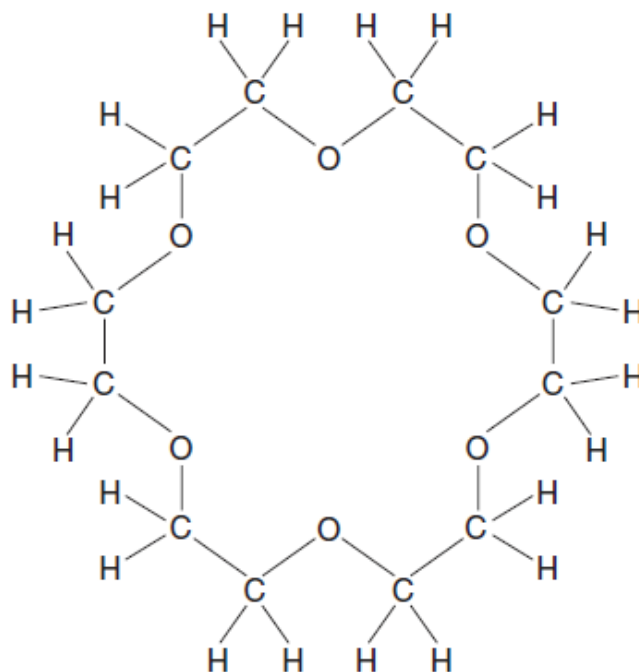
○ chlorine, Cl

Deduce the empirical formula for palladium chloride.

..... [1]

8 Sodium can react with compounds called crown ethers.

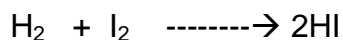
(a) A typical crown ether is shown below.



Write the empirical formula for this crown ether.

..... [1]

9 When hydrogen and iodine are heated in a sealed container an equilibrium is reached with the product, hydrogen iodide.



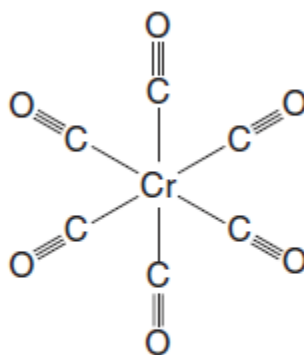
At 400 °C the equilibrium mixture contains 0.4000 grams of hydrogen, 0.07560 grams of iodine and 1.344 grams of hydrogen iodide.

Calculate the percentage of iodine molecules, I₂, by mass in this equilibrium mixture.

- 10 Another compound of bromine and fluorine is bromine(V) fluoride, BrF_5 . Calculate the percentage of bromine by mass in bromine(V) fluoride.

[2]

- 11 Carbon monoxide reacts with chromium to form chromium carbonyl. The structure of chromium carbonyl is shown below.



Write the empirical formula for chromium carbonyl.

..... [1]

- 12 The table shows the energy released when one gram of an alkane or an alkene is completely burned.

molecular formula	Energy released per gram / kJ
CH_4	55.6
C_2H_4	50.3
C_4H_8	42.5
C_4H_{10}	49.6
$\text{C}_{20}\text{H}_{42}$	47.2

A sample of a hydrocarbon contains 0.240 g of carbon and 0.050 g of hydrogen.

- (i) Calculate the empirical formula of this hydrocarbon.
- (ii) The hydrocarbon is one of the compounds in the table. Which one? [3]

13 A 40.5 g sample of a chloride of sulfur contains 21.3 g of chlorine.

(i) Deduce the empirical formula of this chloride of sulfur.

empirical formula[3]

(ii) The relative molecular mass of this chloride is 135.

Deduce the molecular formula of this chloride.

molecular formula[1]

14 Potassium nitrate, potassium sulfate and potassium phosphate are used in fertilisers.

(a) Calculate the percentage by mass of potassium in potassium sulfate, K_2SO_4 .

..... % by mass [2]

15 A sample containing 64.5 g of a chloride of germanium contains 42.6 g of chlorine.

(i) Deduce the empirical formula of this chloride.

empirical formula [3]

(ii) This chloride of germanium has a boiling point of 87°C .

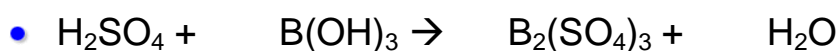
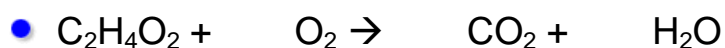
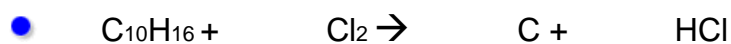
Predict the structure and bonding of this chloride.

.....
..... [2]

16 Concentrated aqueous ammonia is used to make fertilisers such as ammonium phosphate, $(\text{NH}_4)_3\text{PO}_4$.

(a) Calculate the percentage by mass of nitrogen in ammonium phosphate.

17 Balance the following equations, also write state symbols, in each case. % by mass [2]



18 Write the Ionic Equations of the following reactions

