



CHEMISTRY

BOOKS - EVERGREEN CHEMISTRY (ENGLISH)

PART B (STIOCHIOMETRY) PRECENTAGE COMPOSITION -EMPIRICAL & MOLECULAR FORMULA CHEMICAL EQUATION CALCULATIONS

Percentage Composition E Problems Based

1. Calculate the percentage by weight of the following : a] Potassium in

potassium dichromate [K = 39, Cr = 52, O = 16] (b) Phosphorus in calcium

phosphate
$$[Ca_3(PO_4)_2][Ca = 40, P = 31, O = 16]$$

2. Calculate the mass of nitrogen supplied to the soil by 5 kg of urea. $\left[CO(NH_2)_2\right]$ N = 14, C = 12, O = 16, H = 1]



3. Calculate the percentage of water of crystallisation in washing soda

 $Na_2CO_3.10H_2O$ [Na = 23, C = 12, O = 16, H = 1].

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4. Calculate the percentage of pure iron in 10 kg. of iron [III] oxide

 $[Fe_2O_3]$ of 80% purity. [Fe = 56, O = 16].



5. Calculate the number molecules of water of crystallisation in copper sulphate crystals, if 10 g. of hydrous copper sulphate crystals gives 6.4 g.

of anhydrous $CuSO_4$ on heating. [Cu = 64, S = 32, O = 16]



Empirical Molecular Formula F Problems Based

1. A compound of carbon, hydrogen and oxygen is found to contain 40% of carbon, 6.7% of hydrogen and 53.3% of oxygen. Calculate its empirical formula. If its vapours density is 30, calculate the molecular formula. [C = 12, H = 1, O = 16].

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2. A chemical reaction showed that 10.47 g. of the compound contained 6.21 g. of metal 'X' and the rest of a non-metal 'Y'. Calculate the empirical formula of the compound formed between 'X' and 'Y' [At. wt. of X = 207, Y = 35.5]

3. A compound has the following percentage composition : Na = 18.60%, S = 25.80%, H = 4.03% and O = 51.58%. Calculate the molecular formula of the crystalline salt assuming that all the hydrogen in the compound is in combination with the oxygen as water of crystallisation. Molecular weight of the compound is 248. [Na= 23, S = 32, H = 1, O = 16]

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4. Empirical formula of a compound is XY_2 . If its empirical formula weight is equal to its vapour density. Calculate the molecular formula of the compound.



5. State the empirical formula of each compound whose molecular formula is - $C_5 H_{10}$

6. State the empirical formula of each compound whose molecular formula is - H_2CO_2



7. Calculate the empirical formula of a compound whose molecule formula is $C_8H_6O_4$ and empirical formula weight is 83. [C = 12, H = 1, O = 16]



Chemical Equations G Problems Based

1. Calculate the weight of potassium nitrite formed by decomposition of

15.15 g of potassium nitrate. [K = 39, N = 14, O = 16].

2. Copper on reacting with conc. H_2SO_4 produces copper [III] sulphate. If 1.28 g. of copper is to be converted to copper sulphate. Find (i) the weight of the copper sulphate formed and ii] the weight of the acid required. [Cu = 64, S = 32, O = 16].

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3. From the equation $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$. Calculate the weight of $CaCl_2$ obtained from 10g. of $CaCO_3$ and the volume at s.t.p. of CO_2 obtained at a same time. [Ca = 40, C = 12, O = 16, Cl = 35.5]

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4. Combustion of butane takes place as follows : $2C_4H_{10}+13O_2 o 8CO_2+10H_2O.$ Calculate a] the number of moles of

oxygen needed for complete combustion of 58 g of butane, b] the volume of carbon dioxide formed at s.t.p. at the same time. [H = 1, C = 12].

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5. Thermal decomposition of calcium nitrate takes place as follows : $2Ca(NO_3)_2 \rightarrow 2CaO + 4NO_2 + O_2$. If the relative molecular mass of calcium nitrate is 164. a] Calculate the volume of nitrogen dioxide obtained at s.t.p. and b] the weight of calcium oxide obtained when 164 g of calcium nitrate is heated to constant weight. [Ca= 40, O = 16, N = 14].

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6. 2.12g of an impure mixture containing anhydrous sodium sulphate is dissolved in water. An excess of barium chloride solution is added when 1.74 g. of barium sulphate is obtained as a dry precipitate. Calculate the percentage purity of the impure sample. [Na = 23, S = 32, O = 16, Ba = 137].

1.4000 cc. of O_2 burnt with 300 cc. of ethane. Calculate the vol. of unused

 O_2 and CO_2 formed.

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B Mole Concept Avgadro S Number Problem

1. Calculations based on -

The number of moles ii] The mass iii] The volume iv] The number of

molecules v] The gram molecular weight.

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C Mole Concept Avgadro S Law Problem

1. If 30 lits. of O_2 contains 'X' no. of molecules, state the no. of molecules in 10 lits. of H_2 60 lits. of Cl_2 and 5 lits. of NH_3 . All gases collected under the same conditions of temp. & press.



53.3%, the vapour density of the compound is 30, calculate its molecular





G Chemical Equations Problem

1. Copper reacts with dilute nitric acid to give copper nitrate, water and

nitric oxide. Calculate

i] the mass of copper needed to react with 126 g. of HNO_3

ii] vol. of nitric oxide obtained at the same time [Cu = 64, H = 1, O = 16, N =

14].

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Additional Problems Percentage Composition

1. Calculate the percentage by weight of : a] C in carbon dioxide, b] Na in sodium carbonate, c] Al in aluminium nitride. [C = 12, O = 16, H = 1, NA = 23,

Al 27,	Ν	=	14]	
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oxide $[Al_2O_3]$ of 90% purity.



5. State which of the following are better fertilizers - Potassium phosphate $[K_3PO_4]$ or potassium nitrate $[NKO_3]$



6. State which of the following are better fertilizers - Urea $[NH_2CONH_2]$ or ammonium phosphate $[(NH_4)_3PO_4]$ [K = 39, P = 31, O = 16, N = 14, H =

1]

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7. Calculate the percentage of carbon in a 55% pure sample of carbon

carbonate. [Ca = 40, C = 12, O = 16]



8. Calculate the percentage of water of crystalisation in hydrated copper sulphate $[CuSO_4.5H_2O]$. [Cu = 63.5, S = 32, O = 16, H = 1]



9. Hydrated calcium sulphate $[CaSO_4. xH_2O]$ contains 21 % of water of crystallisation. Calculate the number of molecules of water of crystalisation i.e. 'X' in the hydrated compound. [Ca = 40, S = 32, O = 16, H = 1]



Additional Problems Emipirical Molecular Formula

1. A compound gave the following data : C = 57.82%, O = 38.58% and the rest hydrogen. Its vapour density is 83. Find its empirical and molecular formula. [C = 12, O = 16, H = 1]

2. Four g of a metallic chloride contains 1.89 g of the metal 'X'. Calculate

the empirical formula of the metallic chloride. [At. Wt. of 'X' = 64, Cl = 35.5]



3. Calculate the molecular formula of a compound whose empirical formula is CH_2O and vapour density is 30.



4. A compound has the following percentage composition. Al = 0.2675 g., P = 0.3505 g., O = 0.682 g. If the molecular weight of the compound is 122 and its original weight which on analysis gave the above results 1.30 g. Calculate the molecular formula of the compound. [Al = 27, P = 31, O = 16] **5.** Two organic compounds 'X' and 'Y' containing carbon and hydrogen only have vapour densities 13 and 39 respectively. State the molecular formula of 'X' and 'Y'. [C = 12, H = 1]



6. A compound has the following % composition. Zn = 22.65%, S = 11.15%, O = 61.32% and H = 4.88%. Its relative molecular mass is 287 g. Calculate its molecular formula assuming that all the hydrogen in the compound is present in combination with oxygen as water of crystallization. [Zn = 65, S = 32, O= 16, H = 1]

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7. A hydrogen contains 82.8% of carbon. Find its molecular formula if its vapour density is 29. [H = 1, C = 12]

8. An organic compound on analysis gave H = 6.48 % and O = 51.42%. Determine its empirical formula if the compound contains 12 atoms of carbon. [C = 12, H = 1, O = 16]



9. A hydrated salt contains Cu = 25.50%, S = 12.90% O = 25.60% and the remaining % is water of crystallization. Calculate the empirical formula of the salt. [Cu = 64, S = 32, O = 16, H = 1]



10. A gaseous hydrocarbon weighs 0.70 g and contains 0.60 g. of carbon. Find the molecular formula of the compound if its molecular weight is 70. [C = 12, H = 1]

11. A salt has the following % composition :- Al = 10.50%, K = 15.1%, S = 24.8% and the remaining oxygen. Calculate the empirical formula of the salt. [Al = 27, K = 39, S = 32, O = 16]

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Additional Problems Chemical Equations

1. What mass of silver chloride will be obtained by adding an excess of hydrochloric acid to a solution of 0.34 g of silver nitrate. [Cl = 35.5, Ag = 108, N = 14, O = 16, H = 1]

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2. What volume of oxyegen at s.t.p. will be obtained by the action of heat

on 20 g. of *KClO*₃. [K = 39, Cl = 35.5, O = 16]

3. From the equation : $3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 4H_2O + 2NO$.

Calculate

the mass of copper needed to react with 63 of nitric acid .



5. Zinc blende [ZnS] is roasted in air. Calculate :

the number of moles of sulphur dioxide liberated by 776g of ZnS

6. Zinc blende [ZnS] is roasted in air. Calculate :

The weight of ZnS required to produce 22.4 lits of SO_2 at s.t.p. [S = 32, Zn

= 65, O = 16]



7. Ammonia reacts with sulphuric acid to give the fertilizer ammonium sulphate. Calculate the volume of ammonia [at s.t.p.] used to form 59g of ammonium sulphate.

[N = 14, H = 1, S = 32, O = 16].



8. Heat on lead nitrate gives yellow lead [II] oxide, nitrogen dioxide & oxygen. Calculate the total volume of $NO_2 \& O_2$ produced on heating 8.5 of lead nitrate. [Pb = 207, N = 14, O = 16].

9. $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2, C = O_2 \xrightarrow{\Delta} CO_2$. Calculate the amount of $KCIO_3$ which on thermal decomposition gives 'X' vol. of O_2 , which is the volume required for combustion of 24 g. of carbon. [K = 39, CI = 35.5, O=16, C = 12].

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10. Calculate the weight of ammonia gas.

Required for reacting with sulphuric acid to give 78g. of fertilizer ammonium sulphate.



11. Calculate the weight of ammonia gas.

Obtained when 32.6 g. of ammonium chloride reacts with calcium hydroxide during the laboratory preparation of ammonia. $[2NH_4Cl + Ca(OH)_2 \rightarrow CaCl_2 + 2H_2O + 2NH_3]$ [N = 14, H = 1,0 = 16, S= 32, Cl = 35.5]. 12. Sodium carbonate reacts with dil. H_2SO_4 to give the respective salt, water and carbon dioxide. Calculate the mass of pure salt formed when 300 g. of Na_2CO_3 of 80% purity reacts with dil. $H_2SO_4[Na = 23, C = 12, 0 = 16, H = 1, S = 32].$

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13. Sulphur burns in oxygen to give sulphur dioxide. If 16 g. of sulphur burns in X cc. of oxygen, calculate the amount of potassium nitrate which must be heated to produce X cc. of oxygen. [S = 32, K = 39, N = 14, O = 16].



14. Sample of impure magnesium is reacked with dilute sulphuric acid to give the respective salt and hydrogen. If 1g. of the impure sample gave

298.6 cc. of hydrogen at st.p. Calculate the % purity of the sample. [Mg = 24, H = 1]. ♥ View Text Solution
Questions A Gay Lussac S Law Problem Based

1. $[C_4H_{10}]$ [40%] is burnt. Calculate the total volume of carbon dioxide formed. Combustion reactions of the mixture are represented as - $C_3H_8 + 5O_{2(g)} + 3CO_{2(g)} + 4H_2O_{(g)}, 2C_4H_{10(g)} + 13O_2 \rightarrow 8CO_{2(g)} + 4H_2O_{2(g)} + 3CO_{2(g)} + 3CO_{2(g$

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2. 67.2 litres of H, combines with 44.8 litres of N_2 to form $NH_3: N_2(g) + 3H_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$. Calculate the vol. of NH_3 produced. What is the substance, if any, that remains in the resultant mixture.

3. What volume of oxygen is required to burn completely $90md^3$ of butane under similar conditions of temperature & pressure. $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

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4. What volume of ethyne gas at s.t.p is required to produce $8.4dm^3$ of carbon dioxide at s.t.p. $2CH_2 + 5O_2 \rightarrow 4CO_2 + 2H_2O$ [H = 1, C= 12, O=16]

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5. If 6 litres of hydrogen and 4 litres of chlorine are mixed and exploded &

if water is added to the gases formed, find the volume of the residual gas.

6. The equation $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$, represents the catalytic oxidation of ammonia. If $100cm^3$ of ammonia is used, calculate the volume of oxygen required to oxidize the ammonia completely.



7. Propane burns in air according to the following equation: $C_3H_8 + 5O_2 + 3CO_2 + 4H_2O$. What volume of propane is consumed on using $1000cm^3$ of air, considering only 20% of air contains oxygen.



1. $2KMnO_4 \rightarrow KMnO_4 + MnO_2 + O_2$ Given that the molecular mass of $KMnO_4$ is 158, what volume of oxygen [measured at room temp.] would be obtained by the complete decomposition of 15.8 g. of potassium permanganate. [Molar volume at room temperature is 24 litres.]

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2. The volumes of gases A, B, C & D are in the ratio, 1:2:2:4 under the same conditions of temp. & press.

i] Which sample contains maximum no. of molecules. If the temp. & pressure of gas A are kept constant, what will happen to the volume of A when the no. of molecules is doubled. [D, Doubles]

ii] If the volume of 'A' is $5.6dm^3$ at s.t.p., calculate the no. of molecules in the actual vol. of 'D' at s.t.p. [Avog.no.is 6×10^{23}]. Using your answer, state the mass of 'D' if the gas is N_2O '. [N=14,O=16] $[6 \times 10^{23}, 44g.]$ **3.** Calculate the no. of moles & the no. of molecules present in 1.4 g. of éthylene gas $[C_2H_4]$. What is the vol. occupied by the same amount of C_2H_4 . State the vapour density of C_2H_4 . [Avog. No. = 6×10^{23} , C = 12, H = 1]

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4. The equation for the burning of octane is: $2C_8H_{18}+25O_2
ightarrow 16CO_2+18H_2O$

i] How many moles of carbon dioxide are produced when one mole of octane burns.

ii) What volume, at s.t.p. is occupied by the number of moles determined

in 1. i].

iii] If the relative molecular mass of carbon dioxide is 44, what is the mass

of carbon dioxide produced by burning two moles of octane.

5. Define the term - Mole. A gas cylinder contains 24×10^{24} molecules of nitrogen gas. If Avogardro's number is 6×10^{23} and the relative atomic mass of nitrogen is 14, calculate :

(i) Mass of nitrogen gas in the cylinder. (ii) Volume of nitrogen at STP in dm^3

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6. Gas 'X' occupies a volume of $100cm^3$ at S.T.P. and weighs 0.5 g. Find its relative molecular mass.

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7. Dil. HCl is reacted with 4.5 moles of calcium carbonate. Calculate (i) The mass of 4.5 moles of $CaCO_3$. (ii) The volume of CO_2 liberated at step. (iii) The mass of $CaCl_2$ formed. (iv) The number of moles of the acid HCl used in the reaction [relative molecular mass of $CaCO_3$ is 100 and of $CaCl_2$ is 111]



molecular mass of the gas.

11. The vapour density of a gas is 8. What would be the volume occupied

by 24.0 g of the gas at STP.



12. Calculate the volume occupied by 0.01 mole of CO_2 at STP.



13. State Avogadro's Law. A cylinder contains 68 g. of ammonia gas at s.t.p.i] What is the volume occupied by this gas. ii] How many moles & how many molecules of ammonia are present in the cylinder. [N = 14, H = 1]



14. Calculate the mass of Calcium that will contain the same number of atoms as are present in 3.2 gm of sulphur. [S = 32, Ca = 40]



15. Select the correct answer from A, B C & D : The ratio between the number of molecules in 2g of hydrogen and 32g of oxygen is : [H = 1, O =

16]

A. 1:2

B. 1:0.01

C. 1:1

D. 0.01:1

Answer: C

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16. A gas of mass 32 gms has a volume of 20 litres at S.T.P. Calcuate the gram mol. Weight of the gas.

17. A gas cylinder contains 12×10^{24} molecules of oxygen gas. Calculate : i] the mass of O_2 present in the cylinder. (ii) the volume of O_2 at S.T.P. present the cylinder. [O = 16] Avog. No. is 6×10^{23}

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18. Calculate the number of gram atoms in 4.6 grams of sodium [Na = 23]

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19. The mass of 11.2 litres of a certain gas at s.t.p. is 24 g. Find the gram molecular mass of the gas.



20. Calculate : i] The number of moles in 12 g. of oxygen gas. [O = 16] (ii) The weight of 10^{22} atoms of carbon. [C = 12, Avogadro's No. = 6×10^{23}]

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Questions C Mole Concept Avogadro S Law Problem Based

1. The gas law which relates the volume of a gas to the number of molecules of the gas is

A. Avogadro's Law

B. Gay - Lussac's Law

C. Boyle's Law

D. Charles Law

Answer: A

2. A gas cylinder can hold 1 kg. of H_2 at room temp. & press. : i] Find the number of moles of hydrogen present. ii] What weight of CO_2 can the cylinder hold under similar conditions of temp. & press. iii] If the number of molecules of hydrogen in the cylidnder is X, calculate the number of CO_2 molecules in the cylinder under the same conditions of temp. & press. iv] State the law that helped you to arrive at the above result.

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3. If 150 cc. of gas A contains X molecules , how many molecules of gas B will be present in 75 cc. of B. The gases A & B are under the same conditions of temperature & pressure.

Name the law on which the problem is based.

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Questions D Vapour Density Molecular Weight Problem Based

1. Find the relative molecular mass of a gas, 0.546 g of which occupies $360cm^3$ at $87^\circ C$ and 380 mm Hg pressure. [1 litre of hydrogen at s.t.p. weighs 0.09 g]

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2. $2KMnO_4
ightarrow K_2MnO_4 + MnO_2 + O_2$ $[K_2MnO_4 + MnO_2$ is the solid residue]

Potassium permanganate was heated in a test tube. After collecting one litre of oxygen at room temp., it was found that the test tube has undergone a loss in mass of 1.32g. If one litre of H_2 under the same conditions of temp. & pressure has a mass of 0.0825 g. Calculate the relative molecular mass of oxygen.



3. A gas cylinder of capacity of $20dm^3$ is filled with gas X the mass of which is 10 g. When the same cylinder is filled with hydrogen gas at the

same temperature and pressure the mass of the hydrogen is 2 g., hence the relative molecular mass of the gas is :

A. 5 B. 10 C. 15

D. 20

Answer: A

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4. The vapour density of carbon dioxide [C = 12, O = 16] is :

A. A : 32

B. B : 16

C. C : 44

D. D : 22



3. Calculate the % boron [B] in borax $Na_2B_4O_7.10H_2O$. [H = 1, B = 11, O =

16, Na = 32].

4. If a crop of wheat removes 20 kg of nitrogen per hectare of soil, what mass in kg. of the fertilizer calcium nitrate would be required to replace the nitrogen in 10 hectare field. [N = 14, O = 16, Ca = 40].

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5. Calculate the percentage of phosphorus in the fertilizer superphosphate $Ca(H_2PO_4)_2$. [correct to 1 dp].

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6. Calculate the percentage of platinum in ammonium chloroplatinate $(NH_4)PtCl_6$

[Give your answer correct to the nearest whole number]. [N = 14, H = 1, Cl =

35.5, Pt = 195] [44%]



7. Calculate the percentage of nitrogen in aluminium nitride. [Al = 27, N =

14]



8. Calculate the percentage of sodium in sodium aluminium fluoride $[Na_3AlF_6]$ correct to the nearest whole number. [F = 19, Na = 23, Al = 27]







12. Calculate the percentage of water of crystallisation in $CuSO_4.5H_2O$

[H = 1, O = 16, S = 32, Cu = 64]

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Questions F Empirical Formula And Molecular Formula

1. What is the empirical formula of octane. $\left[C_8H_{18}
ight]$

2. A compound contains - Carbon 14.4%, hydrogen 1.2% and chlorine 84.5%. Determine the empirical formula of this compound. Work is its molecular formula. [C = 12, H = 1, Cl = 35.5]

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3. A gaseous compound of nitrogen and hydrogen contains 12.5% hydrogen by mass. Find the molecular formula of the compound it its relative molecular mass is 37. [N = 14, H = 1]

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4. An organic compound has vapour density 94. It contains C = 12.67%, H = 2.13%, and Br = 85.11%. Find the molecular formula of the organic compound. [C = 12, H = 1, Br = 80]

5. A compound having empirical formula X_2Y is made of two elements X & Y. Find its molecular formula if the atomic weight of X is 10 & that of Y is 5 & the compound has a vapour density 25.



6. If the empirical formula of a compound is CH and it has a vapour density of 13, find the molecular formula of the compound. [C = 12, H = 1]

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7. A gaseous hydrocarbon contains 82.76% of carbon. Given that its vaopur density is 29, find its molecular formula. [C = 12, H = 1]

8. A compound of X and Y has the empirical formula XY_2 . Its vapour density is equal to its empirical formula weight. Determine its molecular formula.

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9. The percentage compositions of a gas is : Nitrogen 82.35%, Hydrogen 17.64%. Find the empirical formula of the gas. [N = 14, H = 1]		
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10. Molecular formula of a compound is $C_6H_{18}O_3$. Find its empirical		



11. Find the empirical & molecular formula of an organic compound from the data given : C = 75.92% H = 6.32% & N = 17.76%. The vapour density of the compound is 39.5. [C = 12, H = 1, N = 14]

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Questions G Chemical Equations

1. Washing soda has the formula $Na_2CO_3.10H_2O$. What mass of anhydrous sodium carbonate is left when all the water of crystallization is expelled by heating 57.2 g of washing soda.

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2. $Na_2SO_4 + Pb(NO_3)_2 \rightarrow PbSO_4 + 2NaNO_3$. When excess lead nitrate solution was added to a solution of sodium sulphate. 15.15 g of lead sulphate were precipitated. What mass of sodium sulphate was present in the original solution. [H = 1, C = 12, O = 16, Na = 23, S = 32, Pb =

207]

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3. From the equation : $(NH_4)_2 Cr_2 O_7 o Cr_2 O_3 + 4H_2 O + N_2$ Calculate

(i) the vol. of nitrogen at STP, evolved when 63g. Of ammonium dichromate is heated.

(ii) the mass of Cr_2O_3 formed at the same time. [N = 14, H = 1, Cr = 52, O = 16].

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4. 10 g. of a mixture of NaCl & anhydrous Na_2SO_4 is dissolved in water. An excess of $BaCl_2$ soln. is added & 6.99 g. of $BaSO_4$ is precipitated according to equation : $Na_2SO_4 + BaCl_2 \downarrow + 2NaCl$. Calculate the percentage of Na_2SO_4 in the original mixture. [O = 16, Na = 23, S = 32, Ba 5. The reaction of potassium permanganate with acidified iron [II] sulphate is given below : $2KMnO_4 + 10FeSO_4 + 8H_2SO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 5Fe_2(SO_4)_3 + 6K_2SO_4 + 2MnSO_4 + 5Fe_2(SO_4)_3 + 6K_2SO_4 + 6K_2SO_4$

If 15.8 g. of potassium permanganate was used in the reaction, calculate the mass of iron [II] sulphate used in the above reaction. [K = 39, Mn = 55, S = 32, O = 16]

6. The equations given below relate to the manufacture of sodim carbonate [Mol. Wt. of $Na_2CO_3 = 106$]

(i)
$$NaCl = NH_3 + CO_2 + H_2O \rightarrow NaHCO_3 + NH_4Cl$$
 (ii)

 $2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$

Questions a and (b) are based on the production of 21.2 g of sodium carbonate.

(a) What mass of sodium hydrogen carbonate must be heated to give 21.2 g. of sodium carbonate [Molecular weight of $NaHCO_3=84$].

(b) To produce the mass of sodium hydrogen carbonate calculated in (a),

what volume of carbon dioxide, measured at s.t.p., would be required.



7. The relative molecular mass [mol. wt.] of copper oxide is 80. What vo. of NH_3 [measured at s.t.p.] is required to completely reduce 120g. of CuO. $[3CuO + 2NH_3 \rightarrow 3Cu + 3H_2O + N_2].$



8. A sample of ammonium nitrate when heated yields 8.96 litres of steam (measured at stp).

 $NH_4NO_3 \rightarrow N_2O + 2H_2O$ (i) what volume of dinitrogen oxide is produce at the same time as 8.96 litres of steam. (ii) What mass of ammonium nitrate should be heated to produce 8.96 litres of steam [Relative molecular mass of NH_4NO_3 is 80] **9.** From the equation : $C+2H_2SO_4
ightarrow CO_2+2H_2O+2SO_2.$ Calculate

The volume of SO_2 measured at s.t.p., liberated at the same time.

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10. Commercial NaOH weighing 30g. Has some NaCl in it. The mixture on dissolving in water & treatment with excess $AgNO_3$ soln. formed a precipitate weighing 14.3 g. What is the percentage of NaCl in the commercial sample of NaOH.

 $NaCl + AgNO_3
ightarrow AgCl + NaNO_3$. [Relative molecular mass of NaCl = 58, AgCl = 143]

11. Calculate the volume of oxygen required for the complete combustion of 8.8 g or propane. $[C_3H_8]$ [C 12, O = 16, H = 1, Molar Volume = $22.4dm^3$ at stp]

12. $P + 5HNO_3$ [conc.] $\rightarrow H_3PO_4 + H_2O + 5NO_2$. If 9.3 g of phosphorus was used in the reaction, Calculate : (i) Number of moles of phosphorus taken. (ii) The mass of phosphorus acid formed. (iii) The volume of NO_2 produced at stp. [H = 1, N = 14, P = 31, O = 16]

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13.
$$2KClO_3 \xrightarrow{MnO_2} 2KCl + 3O_2$$

(i) Calculate the mass of $KClO_3$ required to produce 6.72 litre of O_2 at

stp. [K = 39. Cl = 35.5 , O = 16].

(ii) Calculate the no. of moles of O_2 in the above volume & also the no. of molecules.

14. From the equation : $(NH_4)_2 Cr_2 O_7 \xrightarrow{\text{heat}} N_2(g) + 4H_2 O(g) + Cr_2 O_3$. Calculate : (i) the quantity in moles of $(NH_4)_2 Cr_2 O_7$ if 63 gm. of $(NH_4)_2 Cr_2 O_7$ is heated. (ii) the quantity in moles of N_2 formed. (iii) the volume in litres or dm^3 of N_2 evolved at s.t.p. (iv) the mass in grams of $Cr_2 O_3$ formed at the same time. [H = 1, Cr = 52, N = 14]

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15. How much calcium oxide is formed when 82g. of calcium nitrate is heated. Also find the volume of nitrogen dioxide evolved : $2Ca(NO_3)_2 \rightarrow 2CaO + 4NO_2 + O_2$ [Ca = 40, N = 14 O = 16]

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16. Aluminium carbide reacts with water according to the equation : $Al_4C_3+12H_2O o 4Al(OH)_3+3CH_4.$

(i) State what mass of aluminium hydroxide is formed from 12 g. of aluminium carbide.

(ii) State the volume of methane at s.t.p. obtained from 12 g. of aluminium carbide.

[relative molecular weight of $Al_4C_3 = 144$, $Al(OH)_3 = 78$]

View Text Solution

17. Copper [II] sulphate soln. reacts with sodium hydroxide soln. to form

copper hydroxide according to the equation : $2NaOH+CuSO_4
ightarrow Na_2SO_4+Cu(OH)_2 \downarrow$

What mass of copper hydroxide is precipitated using 200 gm of sodium hydroxide. [H = 1, O = 16, Na = 23, S = 32, Cu = 64]

