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Numericals: Revision Holiday homework. Class X

1. Caffeine, a stimulant found in coffee, tea and chocolate contains 49.48% carbon, 5.15% hydrogen, 28.87% nitrogen and 16.49 oxygen, by mass and has a molar mass of 194.0g. Determine the molecular formula of caffeine.
2. A colourless liquid used in rocket engines, whose molecular formula, is NO_2 . has a molecular weight of 92.0 what is its molecular formula?
3. A compound on analysis gave the following percentage composition $\text{Na} = 14.31\%$, $\text{S} = 9.97\%$, $\text{H} = 6.22\%$, $\text{O} = 69.5\%$. Calculate the M.F. that all the hydrogen in the compound is water of crystallisation. M. Mass = 322.
4. Calculate the percentage of phosphorus in magnesium pyrophosphate whose formula is $\text{Mg}_2\text{P}_2\text{O}_7$.
5. An acid of phosphorus has the following has the following percentage composition 2.47% H, 38.27% P, 59.26% O. Find the E.F of this acid and its molecular formula. given that R.M.M = 162.
6. What is the mass of nitrogen in 3.6 kg urea.
7. How many Cl^- ions present in 66.75 g of Aluminium chloride AlCl_3 .
8. Calculate the no of atoms in each of the following:
1) 76 amu of F 2) 76 gm of F 3) 76 mole of F.
9. What is the mass of 50ml of O_2 at STP.
10. How many hydrogen atoms are there in 0.2 mole of H_3PO_4 .
11. Calculate the atomicity of chlorine if 35.5g of it occupies 11200 cm^3 at STP.
12. 0.48g of a gas forms 100 cm^3 of vapour at STP calculate the gram molecular mass of the gas.
13. Calculate the no of molecules in one kg of NaCl .

14. 4.48 dm^3 of a gas at STP is formed weight- 3.55 g . calculate (i) Molecular mass ii) Vapour density.
15. 0.425 g of ammonia occupies a volume of 560 ml at STP calculate the R.M.M of the gas.
16. Calculate the number of grams of glucose present in 0.125 mole of it.
17. Calculate the relative molecular mass of 290 ml of a gas 'A' at 17°C and 1520 mm pressure which weighs 2.73 g at STP.
18. A compound is found to contain 11.2% nitrogen 3.2% hydrogen, 41.2% Chromium and 44.4% Oxygen. Determine the empirical formula. Atomic masses are $\text{N}=14$, $\text{H}=1$ and $\text{O}=16$.
19. 2.3 g of metallic sodium reacts with excess of water. Calculate the mass of sodium hydroxide formed. What is the volume of hydrogen evolved under NTP conditions.
20. 40 ml of methane and 40 ml of ethane mix with each other and burn the mixture with 1000 ml of O_2 and cool the reaction mixture. Give the composition of the resulting mixture.
21. How many grams of Cr are there in 85 g of Cr_2S_3 . At. masses are $\text{Cr}=52$, $\text{S}=32$.
22. 10 g of phosphorus on reacting with oxygen produced 17.77 g of phosphorus oxide. What is its empirical formula.
23. For reaction: $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
when 1.74 g of pure MnO_2 is heated strongly with conc. HCl . Calculate i) moles of MnO_2 . ii) moles and mass of MnCl_2 iii) mass and volume of Cl_2 iv) mass of acid required.
24. A gaseous hydrocarbon contains 82.76% of carbon and its Vapour density is 29 , find its molecular formula.
25. Calculate the g atom present in 4 g of O_2 .