

19. A mixture containing 1.3 millimoles of HNF_2 gas and equal quantity of chlorine gas, was led into a flask containing 5.0 g of KF and allowed to stand for 18 hours at room temperature. The gas ClNF_2 (66.67% yield) and the solid $\text{KF}\cdot\text{HCl}$ were formed. If the volume per cent of ClNF_2 in the gaseous mixture present after the reaction is X , then the value of $\frac{X}{10}$ is
20. In 1.684 g sample of a mixture of $\text{MgSO}_4\cdot 7\text{H}_2\text{O}$ and $\text{MgCl}_2\cdot 6\text{H}_2\text{O}$ containing some inert impurity was subjected to suitable treatment, as a result of which there were obtained 0.699 g of BaSO_4 and 0.888 g of $\text{Mg}_2\text{P}_2\text{O}_7$. The mass percentage of impurity is ($\text{Ba} = 137$, $\text{Mg} = 24$, $\text{P} = 31$)

Four-digit Integer Type

- A sample of ammonia contains only H^1 and H^2 isotopes of hydrogen in 4:1 ratio and N^{14} and N^{15} isotopes of nitrogen in 3:1 ratio. How many neutrons are present in 1.785 mg ammonia? (Answer in the order 10^{18}) ($N_A = 6 \times 10^{23}$)
- The atomic ratio of H^1 to H^3 in a sample of water is $1:8 \times 10^{-8}$. How many H^3 atoms are present in 9.0 g of such water sample? (Answer in the order 10^{15}) ($N_A = 6 \times 10^{23}$)
- Assume that a polyethylene chain is truly linear. If a polymer chain had a molecular mass of 1×10^6 , what will be the length of one polyethylene molecule (in μm)? A carbon-carbon single bond length is 154 pm.
- Chemical formula of a chelating agent versene is $\text{C}_2\text{H}_4\text{N}_2(\text{C}_2\text{H}_2\text{O}_2\text{Na})_4$. If each mole of this compound could bind 1 mol of Ca^{2+} , what would be the rating of pure versene, expressed as mg CaCO_3 bound per g of chelating agent? Here, Ca^{+2} is expressed in terms of the amount of CaCO_3 it could form.
- A polymeric substance, tetrafluoroethylene, can be represented by the formula $(\text{C}_2\text{F}_4)_x$, where x is a large number. The material was prepared by polymerizing C_2F_4 in the presence of a sulphur-bearing catalyst that serves as a nucleus upon which the polymer grew. The final product was found to contain 0.012% S. What is the value of x , if each polymeric molecule contains one sulphur atom? Assume that the catalyst contributes a negligible amount to the total mass of the polymer. ($\text{F} = 19$, $\text{S} = 32$)
- A compact car gets 20 miles per litre on the highway. Gasoline contains 84.0% carbon by mass and has a density of 0.80 g/ml. The mass of CO_2 produced (in g) during a 50 mile-trip is
- A quantity of 2.0 g nitrate of univalent metal was heated with excess of previously ignited silica. A loss in weight of 1.08 g took place due to the total expulsion of the nitrate part of the salt as N_2O_5 . The mass percentage of NO_3^- group in the salt analysed is
- A certain metal 'M' forms an insoluble oxalate complex $\text{M}_4\text{O}_3(\text{C}_2\text{O}_4)_3\cdot 12\text{H}_2\text{O}$. If 3.2 g of the complex is formed from 1 g of oxalic acid, what is the atomic mass of M?
- The maximum mass (in g) of AlCl_3 , which may be formed from 321 g of a mixture of Al_2O_3 and HCl is ($\text{Al} = 27$)
- Chlorine gas can be produced in the laboratory by the reaction

$$\text{K}_2\text{Cr}_2\text{O}_7 + 14\text{HCl} \rightarrow 2\text{KCl} + 2\text{CrCl}_3 + 7\text{H}_2\text{O} + 3\text{Cl}_2$$
 If 75 g sample of $\text{K}_2\text{Cr}_2\text{O}_7$, that is 98% pure, is allowed to react with 365 ml of