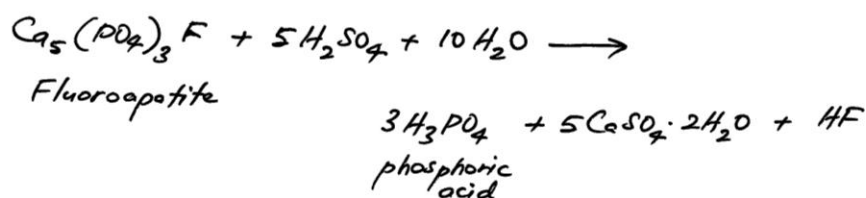


REVIEW QUESTIONS

Q₁ : Phosphoric acid can be prepared by the following reaction :

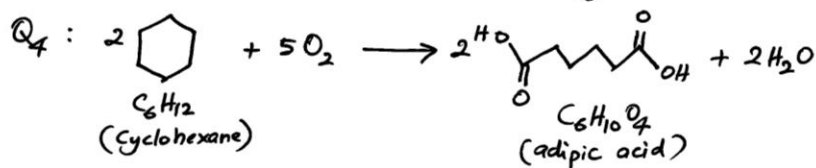


If every kilogram of fluoroapatite yields $3.95 \times 10^2 \text{ g}$ of phosphoric acid, what is the percent yield?

Q₂ : Freons, CCl_2F_2 is manufactured from carbon tetrachloride and hydrogen fluoride. The other reaction product is hydrogen chloride.

- What is the yield of the reaction if the manufacturer obtains 103 kg of freons from 170 kg of CCl_4 .
- Given this reaction yield, what masses of CCl_4 and hydrogen fluoride should be used in order to make 156 kg of the freons.

Q₃ : $\text{C}_{12}\text{H}_{12}\text{N}_2\text{O}_3$ (phenobarbital), a sleep-inducing drug is manufactured in an six-step process starting from toluene, C_7H_8 . Theoretically, each molecule of toluene yields one molecule of phenobarbital. If each of the steps has a yield of 79%, what mass of toluene is needed to manufacture 30 kg of sleep-inducing drug.



If the oxidation reaction above is 80.5% efficient, what mass of cyclohexane is required to produce 4.2 kg of adipic acid.