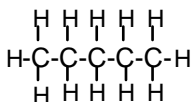


President's Day problem set

- 1) The solubility of iron(II) hydroxide, $\text{Fe}(\text{OH})_2$, is 1.43×10^{-3} gram per litre at 25°C .
- Write a balanced equation for the solubility equilibrium.
 - Write the expression for the solubility product constant, K_{sp} , and calculate its value.
 - Calculate the pH of a saturated solution of $\text{Fe}(\text{OH})_2$ at 25°C .
 - A 50.0 millilitre sample of 3.00×10^{-3} molar FeSO_4 solution is added to 50.0 millilitres of 4.00×10^{-6} molar NaOH solution. Does a precipitate of $\text{Fe}(\text{OH})_2$ form? Explain and show calculations to support your answer.

2)

- Write the balanced equation for the combustion of pentane to yield carbon dioxide and water.
- What volume of dry carbon dioxide, measured at 25°C and 785 mm Hg, will result from the complete combustion of 2.50 g of pentane?
- The complete combustion of 5.00 g of pentane releases 243 kJ of heat. On the basis of this information, calculate the value of ΔH for the complete combustion of one mole of pentane.
- Under identical conditions, a sample of an unknown gas effuses into a vacuum at twice the rate that a sample of pentane gas effuses. Calculate the molar mass of the unknown gas.
- The structural formula of one isomer of pentane is shown below. Draw the structural formulas for the other two isomers of pentane. Be sure to include all atoms of hydrogen and carbon in your structures.



- 3) a) Ammonia gas is bubbled into a solution of hydrofluoric acid
- b) A solution of nickel(II) bromide is added to a solution of potassium hydroxide
- c) Powdered strontium oxide is added to distilled water.
- d) Excess hydrobromic acid solution is added to a solution of potassium hydrogen carbonate.