

Chemistry 120 ... Winter 2010

Problem Set #1

R.J. Le Roy

Due: Wednesday, January 13

Submit STAPLED Solutions in Class *or* to my office (ESC-332) by 5:00 PM

- Atomic masses should be taken from the table on the inner cover of the textbook.
 - Pay attention to significant digits!
 - **Solutions should be written/printed on only one side of the paper. The markers have the discretion to deduct marks for disorganized and/or messy work which is hard to read.**
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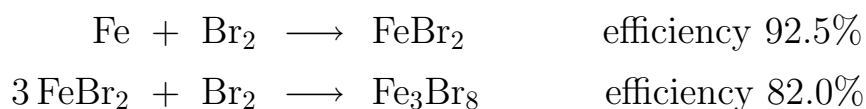
{Questions taken from the Lecture Notes for Chapters 1-4.}

Exercise 15. A sample of gaseous compound made up only of B and H weighing 0.596 g occupies 484 mL at STP. Then burned in excess O₂ it yields 1.17 g of H₂O, and all of the boron is converted to B₂O₃.

What are: (a) its empirical formula? (b) its molecular weight?
(c) its molecular formula? (d) the weight of B₂O₃ produced?

Exercise 16. A 4.22 g sample of a mixture of CaCl₂ and NaCl was dissolved, and then treated to precipitate all of the Ca as CaCO₃(s), which was then heated to drive off CO₂(g), leaving a sample of pure CaO(s) which was found to weigh 0.969 g. What percentage of the original mixture was CaCl₂?

Exercise 17. If Fe₃Br₈ is produced by the following mechanism, where the two reactions have the indicated efficiencies, what mass of Fe₃Br₈ is produced from 10.0 g of Fe and excess Br₂?



Exercise 18. A “stock” solution of HCl(aq) is 36% HCl by mass, and the density of this solution is 1.18 g/mL.

- (a) What is the molarity of this stock solution?
- (b) What volume of this stock solution is required to make 0.750 L of a 0.250 M solution of HCl(aq)?
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