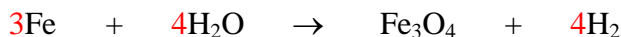


1. Balance the following reaction. (2 pts)



Atom	R	P
Fe	3(1)	3
O	4(1)	4
H	2(8)	(2)4

2. An unknown sample contains 27.3 % carbon and 72.7 % oxygen by mass. Determine the empirical formula for this compound. (4 pts)

Assume a 100 g sample:

$$27.3 \text{ g C} \times 1\text{mol}/12\text{g} = 2.275 \text{ mol C} \quad \text{Divide by the smallest} \quad / \quad 2.275 \text{ mol} = 1$$

$$72.7 \text{ g O} \times 1\text{mol}/16 \text{ g} = 4.544 \text{ mol O} \quad / \quad 2.275 \text{ mol} = 2$$

Empirical Formula



Carbon dioxide

3. Calculate the maximum grams of iodic acid (HIO_3) than can be produced if 685 g of iodine trichloride is reacted with 117.4 g of water. (4 pts)



$$685 \text{ g ICl}_3 \times \frac{\text{mol}}{232 \text{ g}} = 2.953 \text{ mol ICl}_3$$

$$117.4 \text{ g H}_2\text{O} \times \frac{\text{mol}}{18} = 6.522 \text{ mol H}_2\text{O}$$

ICl_3 is the limiting reagent:

$$2.953 \text{ mol ICl}_3 \times \frac{1 \text{ mol HIO}_3}{2 \text{ mol ICl}_3} \times \frac{176 \text{ g}}{\text{mol}} = 259.9 \text{ g HIO}_3$$