

4. [13 points] *For each problem on this page, show your work step-by-step. (Don't forget to use appropriate units in your answers.)*

Ozone is a molecule consisting of three oxygen atoms that is unstable and decays to the stable form of oxygen. The half-life of gaseous ozone at a temperature of  $20^\circ\text{C}$  is 3 days (72 hours).

- a. [4 points] Find the continuous hourly percent decay rate of gaseous ozone at  $20^\circ\text{C}$ .  
*Give your answer in exact form.*

**Answer:** \_\_\_\_\_

- b. [4 points] At a temperature of  $20^\circ\text{C}$ , how long does it take for the amount of gaseous ozone to be reduced by 90%? *Give your answer in exact form.*

**Answer:** \_\_\_\_\_

When ozone is dissolved in water, it is referred to as “aqueous ozone.” At a temperature of  $20^\circ\text{C}$ , aqueous ozone decays at a rate of 12.5% per hour.

- c. [5 points] Suppose that in a  $20^\circ\text{C}$  lab, the amount of aqueous ozone is initially 5 times the amount of gaseous ozone. When will the two amounts be equal?  
*Give your answer in exact form.*

**Answer:** \_\_\_\_\_