**Quiz#6**
Math 221

**Instructions.** Be sure to show your work and explain your reasoning for full credit.

**NAME ____________________________**

1. Experiments show that if the chemical reaction \( N_2O_5 \rightarrow 2NO_2 + \frac{1}{2}O_2 \) takes place at 45° C, the rate of reaction of dinitrogen pentoxide is proportional to its concentration:

\[
\frac{d[N_2O_5]}{dt} = -0.0005[N_2O_5]
\]

(a) Find an expression for the concentration \([N_2O_5]\) after \( t \) seconds if the initial concentration is \( C \).

(b) How long will the reaction take to reduce the concentration of \( N_2O_5 \) to 90% of its original value (just a numerical expression will suffice, no need to reduce)?

2. If two resistors with resistance \( R_1 \) and \( R_2 \) are connected in parallel then the total resistance \( R \), measures in ohms \( \Omega \) is given by \( \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} \). If \( R_1 \) and \( R_2 \) are increasing at rates of 0.3 \( \Omega/s \) and 0.2 \( \Omega/s \) respectively, then how fast is \( R \) changing when \( R_1 = 80 \Omega \) and \( R_2 = 100 \Omega \)?