CYL565 2014–15 **Quiz** Feb. 4, 2015

Name: _____ Entry No.: _____

1. What would the relaxation time be if a T-jump experiment is conducted in heavy water? The equilibrium constant for the reaction $D^+ + OD^- \longrightarrow D_2O$ is $4.08 \times 10^{16}\,mol^{-1}\,dm^3$, and the rate constant for the reverse reaction is independently found to be $2.52 \times 10^{-6}\,s^{-1}$. The density of D_2O is $1.04\,g\,cm^{-3}$.

2. The enzyme carbonic anhydrase catalyzes the reaction $CO_2 + H_2O \longrightarrow HCO_3^- + H^+$. When CO_2 is present in excess the Michaelis constant and turnover number are $1.2 \times 10^{-2}\,mol\,dm^{-3}$ and $1.0 \times 10^6\,s^{-1}$, while in the presence of excess HCO_3^- they are $2.6 \times 10^{-2}\,mol\,dm^{-3}$ and and $4.0 \times 10^5\,s^{-1}$ respectively. Determine ALL the rate constants for the elementary steps in the reaction mechanism.