Q2: We define the sequence $a_n = diam(\bigcap_{j=1}^{n} K_j) = diam K_n$. Since each $K_{n+1} \subset K_n$, we have that $a_{n+1} \leq a_n$. Since each $a_i \geq \mu$, $(a_n) \to a$, with $a \geq \mu$ by the monotone convergence theorem. By definition of the sequence, $diam(K) = a$, so $diam(K) \geq \mu$.