Q1. Let $X$ and $X'$ be minimal separators in $G$ such that $X$ meets (intersects non-trivially) at least two components of $G - X'$. Show that $X'$ meets all the components of $G - X$, and that $X$ meets all the components of $G - X'$.

Q2. Show the block graph of any connected graph is a tree.

Q3. Let $G$ be a $k$-connected graph, and let $xy$ be an edge of $G$. Show that $G/xy$ is $k$-connected if and only if $G - \{x, y\}$ is $(k - 1)$-connected.

Q4. (i) Let $e$ be an edge in a 2-connected graph $G \neq K^3$. Show that either $G - e$ or $G/e$ is again 2-connected.

(ii) Does every 2-connected graph $G \neq K^3$ have an edge $e$ such that $G/e$ is still 2-connected?

Q5. Show that every transitive graph $G$ with $\kappa(G) = 2$ is a cycle. Hint: Exercise 3.4 is useful.