Problem 1. Let $G$ be a 3-regular graph. Show that its edge-connectivity equals its vertex-connectivity.

Problem 2. Compute the number of labeled spanning trees of the complete bipartite graph $K_{m,n}$.

Problem 3. Compute the number of labeled trees in which all degrees are either 1 or 3.

Problem 4. Let $G$ be a bipartite graph on vertex sets $A = \{a_1, \ldots, a_n\}$ and $B = \{b_1, \ldots, b_m\}$. Suppose every vertex in $A$ has degree at least $q$ and every vertex in $B$ has degree at most $r$. Show that $B$ contains $n$ disjoint sets $S_1, \ldots, S_n$, each of size at least $\lfloor q/r \rfloor$ such that for every $1 \leq i \leq n$ vertex $a_i$ is connected to all the vertices in $S_i$.

Problem 5. Derive Hall’s Theorem from the König-Egerváry Theorem.