As always, make sure to cite any hypotheses, any previous results or problems used, etc. at the appropriate places in your proofs. Also, make sure to appropriately start and end your proofs. Problems do not have the same value in computing your test grade.

1. Let $\kappa$ be a regular, uncountable cardinal and $\langle C_\alpha | \alpha < \kappa \rangle$ be a sequence of club subsets of $\kappa$. Prove $\Delta_{\alpha<\kappa} C_\alpha$ is also club.

2. State and prove one of the two versions of Fodor’s Theorem: Either the one involving stationary subsets of a regular uncountable cardinal or the one involving normal measures on a measurable cardinal.

3. Recall the following theorem: Let $\kappa$ be a regular, uncountable cardinal. Every stationary subset of $E_\kappa^\omega$ is the union of $\kappa$ pairwise disjoint stationary sets. State and prove the main lemma to this theorem.

4. Prove that every measurable cardinal carries a normal measure. Recall you may choose to indicate that it is routine to show the order which you define on the equivalence classes is a linear order and that you may cite what is needed show this ordering is a well-ordering. You may also cite that it is routine to use the properties of the original nonprincipal $\kappa$-complete ultrafilter and the function that you will select to show that the normal measure that you define is in fact also a nonprincipal $\kappa$-complete ultrafilter, thus leaving to show that it is normal.

5. Prove the induction step of the following theorem: If $D$ is a normal measure on a measurable cardinal $\kappa$, then for every $\varphi : \left[ \kappa \right]^{<\omega} \rightarrow I$ such that $|I| < \kappa$ there exists $H \in D$ which is homogeneous for $\varphi$. 