Problem 5 on the final exam, 22C:253, fall 2004  The PARTIAL VERTEX COVER problem (PVC) takes as input a vertex weighted graph $G = (V,E)$, $w : V \rightarrow Q^+$, and an integer $p \geq 0$. The problem is to find a subset of vertices with smallest weight that cover (some) $p$ edges.

1. Write down the LP relaxation for this problem and the dual of this relaxation.

2. Use the primal-dual framework to obtain a factor-4 approximation algorithm for this problem.