23.1-6

1) Let's assume there are two MST T_1 and T_2 of the graph G. Let (u, v) be an arbitrary edge of T_1. Consider there is a cut (S, V-S) across (u, v) and (x, y) be the unique light edge cross this cut. If (x, y) not equal to (u, v), then the spanning tree {T_1 minus (u, v) plus (x, y)} has a lower weight than T_1, which is means T_1 is not MST, therefore, (u, v)==(x, y). (or by Exercise 23,1-3)

Now consider there is an edge (m,n) in T_2 crossing (S, V-S). using same theorem above, (m, n) must be equal to (x, y). In another word, for the cut (S, V-S), the edge (u, v) and (m, n) must be the same edge. As we choose (u, v) arbitrarily from T_1, every edge in T_1 will be also be in T_2. Therefore, T_1 and T_2 has to be same.

2) in this graph, the orange cut is the counterexample