

EE 2720

Homework # 3, Fall 03

Due Wednesday October 29 at 9:30 am  
in my office; (Room EE 245).

Note: Please STAPLE your homework

Note: Problems 1-10 below ask you to prove theorems found in handout #5.

Problem 1: Prove theorem  $(T1')$ . You are not allowed to use the Principle of Duality. In other words don't tell me because  $(T1)$  is true so is  $(T1')$ .

Problem 2: Repeat problem 1 but now for theorem  $(T2')$ .

Problem 3: Repeat problem 1 but now for theorem  $(T3)$ .

Problem 4: Repeat problem 1 but now for theorem  $(T3')$ .

Problem 5: Repeat problem 1 but now for theorem  $(T4)$ ; (there is no dual of  $(T4)$  here anyways).

Problem 6: Repeat problem 1 but now for theorem  $(T5')$ .

Problem 7: Prove theorem  $(T7)$  by using a truth table; (as explained in handout #5 this is the so called perfect induction method. See my note on page 14 of handout #5).

Problem 8: Prove theorem  $(T10')$ . You are not allowed to use the Principle of Duality and you are not allowed to use a truth table. You must use other theorems.

Problem 9: Prove theorem (T11'). You are not allowed to use the Principle of Duality and you are not allowed to use a truth table. Hint: Use the theorem that states  $(X+Y) \cdot (X'+Z) = X \cdot Z + X' \cdot Y$ . This theorem was stated and proved in handout #6; (the proof is not that difficult).

Problem 10: Prove theorem (T13') using the finite induction technique. Look on page 6 of handout #5 to see what the finite induction technique is.

Problem 11: Prove the theorem that states  $(X+Y) \cdot (X'+Z) = X \cdot Z + X' \cdot Y$ . You are not allowed to use a truth table. You must use the theorems provided in handout #5. of course, you must provide a different proof than the one I provided in handout #6. (proof is really easy).