Take-Home Examination:  100 Points

Help your Uncle George! (You may rely on a friend, if you so choose)

It seems your Uncle George has gotten himself in trouble again. He was replacing a 120 V duplex wall outlet in his home. He had opened the circuit breaker (so he claims!) and was working inside the metal enclosure for the outlet. At that point his screwdriver simultaneously contacted both the bare end of the black wire and the metal box. The resulting shower of sparks gave him quite a scare, but did not result in injury (although Aunt May said, “It would have served you right, George!”) Upon inspection, it was determined that the 15 amp breaker was indeed in the OFF position, but that the contacts had corroded and continued to make electrical contact.

This is all well and good. However, George happens to know that you are an electrical engineering student. Therefore, he asks you the following question, “Just how many amps was I drawing through that screw driver?”

As you silently curse your decision to pursue EE and your mother for having a brother, you make the best of the situation and working with George to construct the following sketch:

With sketch in hand, you inform George that you’ll need to consult some references and make some calculations. Finally, you escape George’s house, promising you’ll give him a complete Engineering Report on this incident.

WRITE THIS REPORT AS PROMISED, CLEARLY STATING ANY ASSUMPTIONS