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| **Problem 34.45** |
| Electricity is distributed from electrical substations to neighborhoods at 1.5×104 {\rm V}. This is a 60{\rm Hz} oscillating (AC) voltage. Neighborhood transformers, seen on utility poles, step this voltage down to the 120{\rm V} that is delivered to your house.   |  |  | | --- | --- | | Part A |  | | How many turns does the primary coil on the transformer have if the secondary coil has 110 turns?  **Express your answer using two significant figures.**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | ANSWER: | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | n_{\rm prim} = | ***Answer not displayed*** | turns |  | | | | | Part B |  | | No energy is lost in an ideal transformer, so the output power P_{\rm out}from the secondary coil equals the input power P_{\rm in}to the primary coil. Suppose a neighborhood transformer delivers 300 {\rm A} at 120 {\rm V}. What is the current in the 1.5×104 {\rm V} line from the substation?  **Express your answer using two significant figures.**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | ANSWER: | |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | I_{\rm i} = | ***Answer not displayed*** | {\rm A} |  | | | | |