Transformer Practice Name:_____

1) Currents of 0.25 A and 0.95 A flow through the primary and secondary coils of a transformer respectively, if there are 1.0×10^3 turns in the primary coil how many turns are in the secondary coil?

$$\frac{N_p}{N_s} = \frac{I_s}{I_p} \rightarrow \frac{1.0 \times 10^3}{?} = \frac{0.95}{0.25}$$

$1.0 \times 10^3 \times 0.25 \div 0.95 =$ 260 turns

2) A step-down transformer has coils of 1.20×10^3 and 1.5×10^2 turns. The transformer is connected to a 120 volt power line, and the current in the secondary coil is 5.00 A. What is the current in the primary coil?

$$\frac{N_p}{N_s} = \frac{I_s}{I_p} \rightarrow \frac{1.20 \times 10^3}{1.5 \times 10^2} = \frac{5.00A}{?}$$

$1.5 \times 10^2 \times 5 \div 1.20 \times 10^3 =$ 0.63A

step down

so voltage decreases from primary to sec, so more loops in primary

3) Near your home the voltage of the power line is 3600 V. The transformer between your home and the line reduces this voltage to 120 V. If the transformer is to deliver 2400 J of energy each second to your house, what is the current in:

Power = I V

$\frac{P}{V} = I$

a) the primary coil

$$\frac{2400}{3600} = 0.67A$$

b) the secondary coil

$$\frac{2400}{120} = 20A$$

Questions taken from Mr. Trask's Physics

Transformer Practice Name:_____

4) A step-down transformer (N_p= 150, N_S=25) is connected to a 120 V primary line. If there is a 75Ω electrical device placed in the secondary circuit, what is the current in the primary coil?

$\frac{N_p}{N_S} = \frac{V_p}{V_S} \rightarrow \frac{150}{25} = \frac{120}{?} \rightarrow V_s = 25 \times 120 \div 150$

$= 20V$

$I_s = \frac{V}{R} = \frac{20}{75} = 0.2667A$

$\frac{150}{25} = \frac{0.2667}{?} \rightarrow I_p = 0.044A$

5) If the voltage and current of the primary coil is 120 V and 3.0 A, what is the power delivered to the secondary coil?

Power is same in each

so $P_s = P_p = VI = 120 \times 3 = 360$ Watts

6) If the power delivered to the secondary coil of a step-up transformer is 50.0 from a 120 V power line, what is the current in the primary coil?

Power is same in each

$P = VI$

$\frac{P}{V} = I$

$\frac{50 volts}{120V} = I$

$= 0.42A$

Transformer Practice Name:_____

Secondary

7) A transformer (N_p= 550, N_S=36) is connected to a 120 V power line. If the current in the ~~primary~~ coil is 1.0 A, what is the ~~power~~ Power in the secondary coil?

~~Voltage, current and power~~

~~Power is same in each S~~

$$\frac{550}{36} = \frac{I_s}{I_p}$$

$$\frac{550}{36} = \frac{1}{?} \rightarrow I_p = 36 \times 1 \div 550$$

$$= 0.06545$$

Power = 7.85 W

8) A 100 W transformer (Ns = 1500) has an input voltage of 9.0 V and an output current of 0.65 A. How many turns are on the primary coil?

Since it is 100W we can calculate Current in primary

$$P = IV$$

$$\frac{P}{V} = I \rightarrow \frac{100}{9} = 11.11 \text{ A}$$

$$\frac{I_s}{I_p} = \frac{N_p}{N_s} \rightarrow \frac{0.65}{11.11} = \frac{?}{1500}$$

$$N_p = 0.65 \times 1500 \div 11.11$$

$$= 88 \text{ loops}$$

Questions taken from Mr. Trask's Physics