Answer on question #51522, Physics, Electromagnetism

Question An air-cored transformer is assumed to be 100% efficient. The ratio of the secondary turns to the primary turns is 1:20. A 240v ac supply is connected to the primary coil and a 6ohms load is connected to the secondary coil. what is the current in the primary coil a) 0.10A b) 0.14A c) 2.0A d) 40.0A

Solution Voltage in secondary coil is 20 times smaller, hence it is 240/20 = 12 V. Current in secondary coil then is

$$I_2 = \frac{U_2}{R_2} = \frac{12}{6} = 2\,A$$

In primary coil current is 20 times bigger, hence

$$I_1 = 20I_2 = 20 \cdot 2 = 40\,A$$

Answer is d.