

A radio set operates at 6 V DC. A transformer with 18 turns in the secondary coil is used to step down the input 220 V AC emf to 6 V AC emf. This AC emf is then rectified by another circuit to give 6 V DC which is fed to the radio. Find the number of turns in the primary.

1. So, in the question, 220V AC emf is step-down to 6V AC emf. And then, this 6V AC emf is rectified to 6V DC emf to operate the radio.

$$\therefore N_s = 18, \quad \mathcal{E}_p = 220\text{V}, \quad \mathcal{E}_s = 6\text{V}, \quad N_p = ?$$

$$\therefore \frac{\mathcal{E}_p}{\mathcal{E}_s} = \frac{N_p}{N_s}$$

$$\Rightarrow N_p = \left(\frac{\mathcal{E}_p}{\mathcal{E}_s} \right) N_s$$
$$= \frac{220 \times 18}{6}$$

$$\Rightarrow \boxed{N_p = 660}$$