

Q- A step-down transformer is used for recharging the batteries of portable devices. The number of turns ratio inside the transformer is 13:1 and it is used with 120-V (rms) household service. If particular ideal transformer draws 0.350 A from the house outlet, what are

(a) The voltage

The input and output voltage of an ideal transformer is related to the number of turns by

$$\frac{V_{out}}{V_{in}} = \frac{n_{out}}{n_{in}}$$

Or $V_{out} = V_{in} \frac{n_{out}}{n_{in}} = 120 * \frac{1}{13} = 9.23 \text{ V}$

(b) The current supplied to a tape player from the transformer?

The input and output current is given by the relation

$$\frac{I_{out}}{I_{in}} = \frac{n_{in}}{n_{out}}$$

Or $I_{out} = I_{in} \frac{n_{in}}{n_{out}} = 0.350 * 13 = 4.55 \text{ A}$

(c) How much power is delivered?

The power is given by

$$P = V * I = 9.23 * 4.55 = 42.0 \text{ W}$$