

The battery voltage in Figure 1 is $E = 12\text{ V}$ and its capacity is 100 Wh. the average charging should be $I_{dc} = 5\text{ A}$. The primary input is $V_P = 120\text{ V}$, 60 Hz and the transformer has a ratio of $n = 2:1$. Calculate the conduction angle δ of the diode.

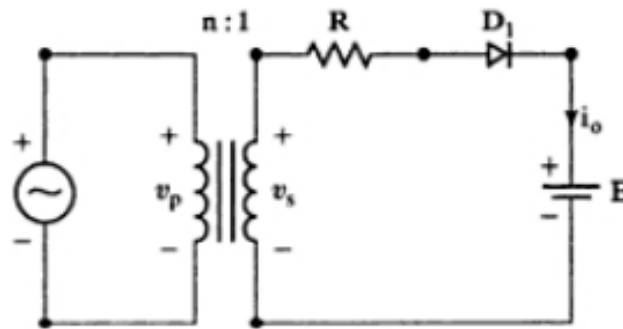


Figure 1: circuit

$$V_S = \frac{V_P}{n} = \frac{120}{2} = 60\text{ V}, \quad V_m = \sqrt{2}V_S = \sqrt{2} \times 60 = 84.85\text{ V}$$

$$\alpha = \sin^{-1}\left(\frac{E}{V_m}\right) = \sin^{-1}\left(\frac{12}{84.85}\right) = 8.13^\circ$$

$$\beta = 180 - 8.13 = 171.87^\circ, \quad \delta = \beta - \alpha = 171.87 - 8.13 = 163.74^\circ$$

Good Luck- Adineh