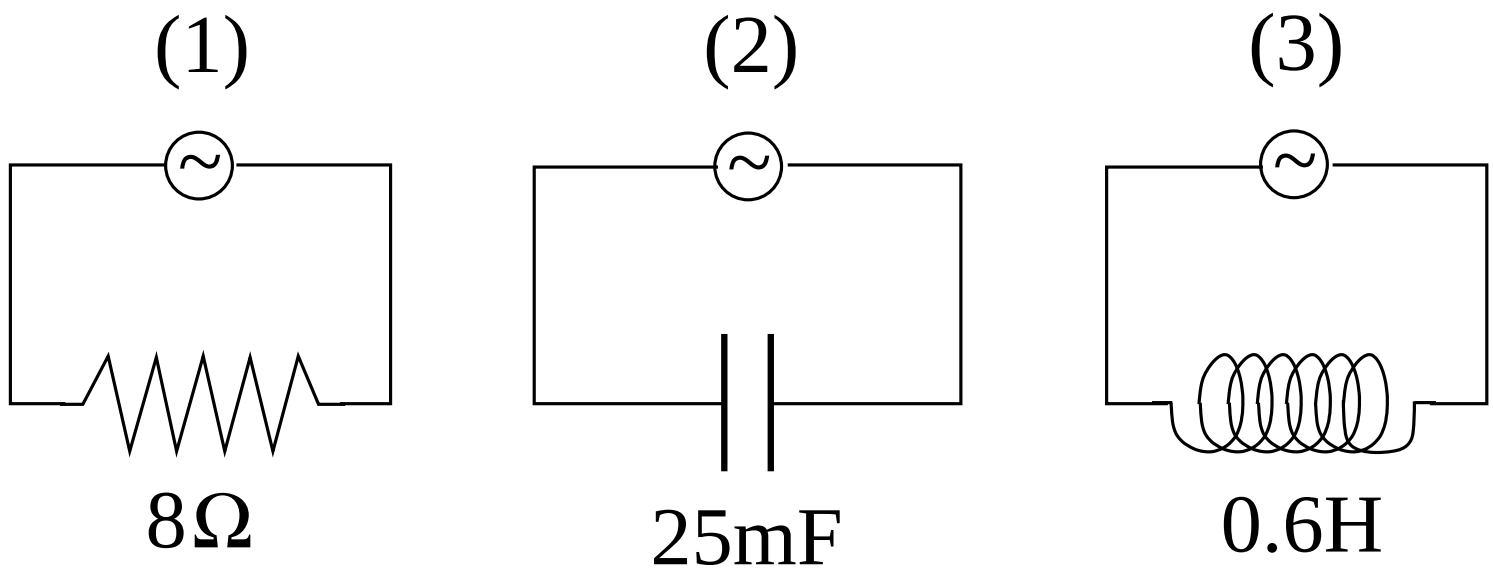
Single Device in AC Circuit: Application (1)

The ac voltage source $\mathcal{E} = \mathcal{E}_{max} \sin \omega t$ has an amplitude of $\mathcal{E}_{max} = 24$V and an angular frequency of $\omega = 10$rad/s.

In each of the three circuits, find

(a) the current amplitude I_{max},

(b) the current I at time $t = 1$s.



Single Device in AC Circuit: Application (2)

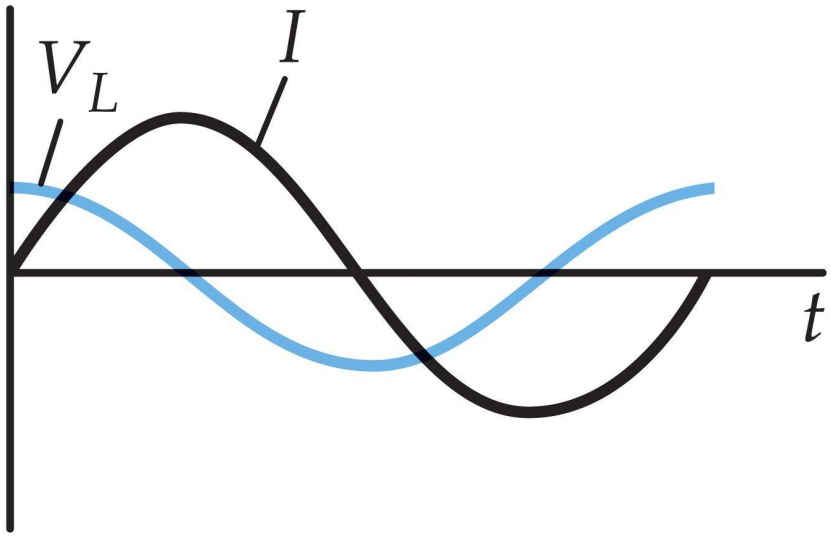
Consider an ac generator $\mathcal{E}(t) = \mathcal{E}_{max}\cos(\omega t)$, $\mathcal{E}_{max} = 25$V, $\omega = 377$rad/s connected to an inductor with inductance $L = 12.7$H.

(a) Find the maximum value of the current.

(b) Find the current when the emf is zero and decreasing.

(c) Find the current when the emf is -12.5V and decreasing.

(d) Find the power supplied by the generator at the instant described in (c).



Single Device in AC Circuit: Application (3)

Consider an ac generator $\mathcal{E}(t) = \mathcal{E}_{max}\cos(\omega t)$, $\mathcal{E}_{max} = 25$V, $\omega = 377$rad/s connected to a capacitor with capacitance $C = 4.15\mu$F.

(a) Find the maximum value of the current.

(b) Find the current when the emf is zero and decreasing.

(c) Find the current when the emf is -12.5V and increasing.

(d) Find the power supplied by the generator at the instant described in (c).