Phasors 016

2 of 5 attempts made

The AC circuit below is in steady-state, and you are not told the ω of the source. The phasor diagram shows the phasors of $\boldsymbol{i_S}$ and $\boldsymbol{i_a}$.

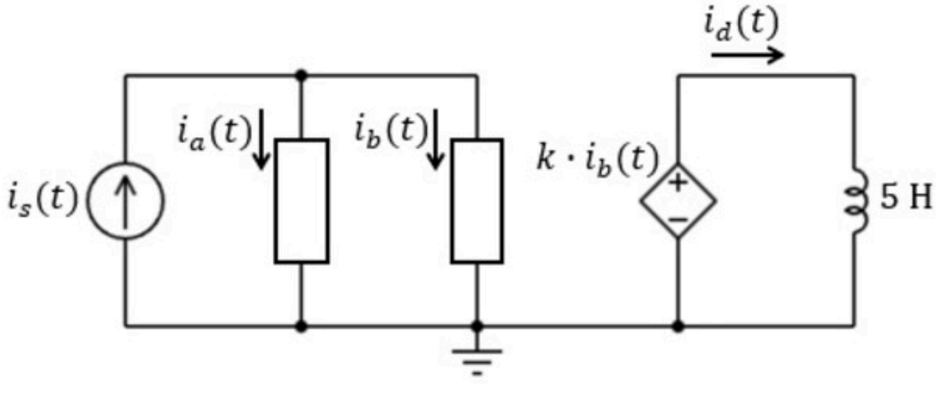
The rectangular boxes represent two circuit elements. One of them is an inductor L_1 (but you don't know if it corresponds to i_a or i_b). The other can be a resistor R_2, a capacitor C_2 or an inductor L_2.

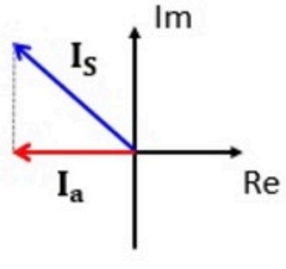
You are also told that the maximum value of $i_a(t)$ is A_1 and the maximum value of $i_S(t)$ is A_2.

a. What is the maximum value of the $i_b(t)$ waveform, i_{bmax}?

b. With $i_d(t)$ expressed as $A \cdot \cos(\omega t + B_1)$, what is B_1? Constraints: $A > 0$ and $-180° < B_1 \leq 180°$.

c. What is the value of ω?





Given Variables:

A1 : 4 A
A2 : 5 A
L1 : 2 mH
R2 : 3 ohm
C2 : 10 mF
L2 : 3 mH
k : -5 V/A

Calculate the following:

ibmax (A) :

3 ✓

B1 (degrees) :

180 ✓

omega (rad/s) :

2000 ✓