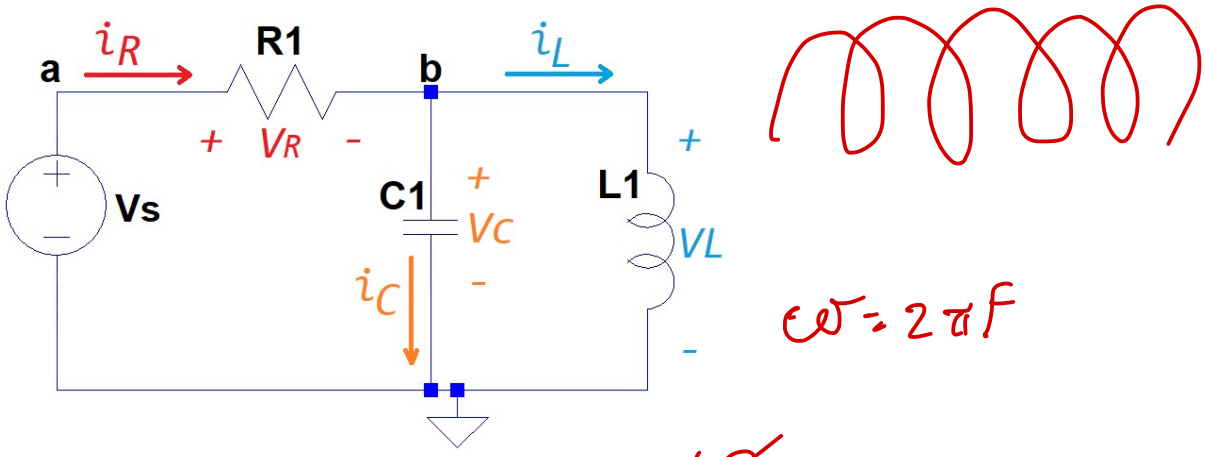



Given $R = 100\ \Omega$, $C = 2\mu$ F, $L = 80\ m$ H, $V_s = 10\cos(1256.637\ t)$, determine values of the following variables at AC steady state:

Q1. Magnitude of $V_s$ in Vp (peak voltage),

Q2. Frequency of $V_s$ in Hz,

Q3. Phase of $V_s$ in radian within range $(-\pi, \pi]$.

Q4. Phasor $V_s$ in rectangular form (if it is a complex, write in `a + j b` format---there is a space between j and the imaginary number),

Q5. Impedance of resistor $R$ in ohm,

Q6. Impedance of capacitor $C$ in ohm (if it is a complex, write in `a + j b` format---there is a space between j and the imaginary number),

Q7. Impedance of inductor $L$ in ohm (if it is a complex, write in `a + j b` format---there is a space between j and the imaginary number),

Q8. Magnitude of current $i_R$ in Ap (peak ampere)

Q9. Frequency of current $i_R$ in Hz,

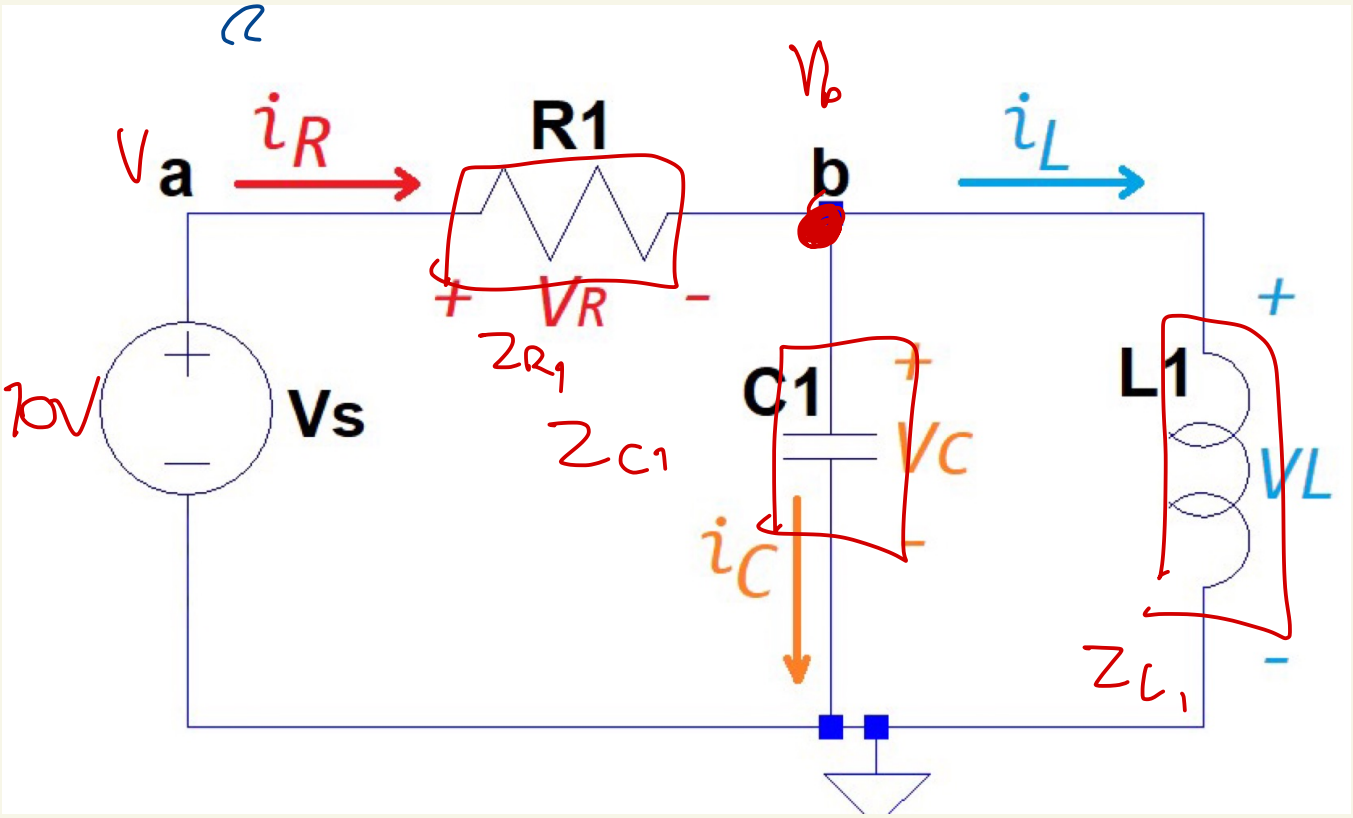
Q10. Phase of current $i_R$ (with reference to the phase of voltage Vs) in radian within range $(-\pi, \pi]$.

*Hint:* convert Vs to phasor and use phasor analysis.

Write your answers in the following format.

```
Q1.1. magp_vs = 0 V
Q1.2. freq_vs = 0 Hz
Q1.3. phase_vs = 0 rad
Q1.4. rec_phasor_vs = 0 V
Q1.5. ZR = 0 ohm
Q1.6. ZC = 0 ohm
Q1.7. ZL = 0 ohm
Q1.8. magp_ir = 0 A
Q1.9. freq_ir = 0 Hz
Q1.10. phase_ir = 0 rad
```

$i = \frac{\Delta V}{R}$




$$\frac{10 - V_b}{Z_R} + \frac{V_b}{Z_C} + \frac{V_b}{Z_L} = 0$$

$$\frac{10}{Z_R} - \frac{V_b}{Z_R} + \frac{V_b}{Z_C} + \frac{V_b}{Z_L} = 0$$

$$V_b \left( -\frac{1}{Z_R} + \frac{1}{Z_C} + \frac{1}{Z_L} \right) = -\frac{10}{Z_R}$$

$$V_b = \frac{\frac{-10}{Z_R}}{\left(-\frac{1}{Z_R} + \frac{1}{Z_C} + \frac{1}{Z_L}\right)}$$

$$i_R = \frac{10 - V_b}{Z_R}$$