A series RLC circuit like the one shown here will be constructed in the lab this week. Assume that the generator resistance \( R_g = 50 \, \Omega \), the external resistor \( R_e = 100 \, \Omega \), \( L = 47 \, \text{mH} \), \( r = 227 \, \Omega \). Also, assume that \( v_g(t) = 4 \cos(2\pi ft) \) volts, where \( f = 10 \, \text{kHz} \).

1. Compute the quality factor of the inductor at \( f = 10 \, \text{kHz} \).
   \[ Q = \ldots \]

2. Compute the value of the capacitor needed to resonate with the inductor at 10 kHz.
   \[ C = \ldots \]

3. Compute the bandwidth of the resonant circuit in Hz.
   \[ \text{BW} = \ldots \]

4. Compute the quality factor for the circuit at resonance.
   \[ Q_c = \ldots \]

5. Define the phasor voltage \( V_g \) provided by the function generator.
   \[ V_g = \ldots \]

6. Compute the corresponding phasor current \( I \) in the circuit at resonance.
   \[ I = \ldots \]

7. Compute the corresponding phasor voltage \( V_C \) across the capacitor at resonance.
   \[ V_C = \ldots \]

8. Compute the power dissipated by the external resistor \( R_e \) at resonance.
   \[ P_{Re} = \ldots \]

9. Compute the real power dissipated in the inductor at resonance.
   \[ P_r = \ldots \]