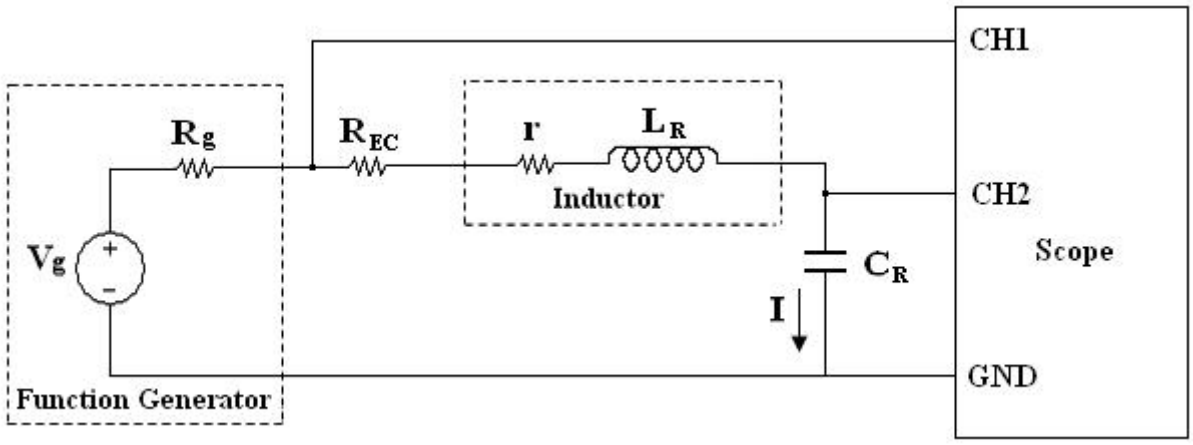
JEE2330 – Spring 2025
Lab #2B Problem

In the laboratory, you are to construct the RLC circuit shown below. Assume the following: $v_g(t) = 6\ u(t)$, $R_g = 50\ \Omega$, $R_{EC} = 450\ \Omega$, $L_R = 500$ mH, $C_R = 1\ \mu$F, and that the coil resistance r of the inductor L_R is 150 Ω. Note that u(t) is the unit-step function.



1. What is the final value of the capacitor voltage? $v_C(\infty)$ = _____

2. What is the final value of the current in this circuit? $I(\infty)$ = _____

3. What is the neper frequency? α = _____

4. What is the undamped natural frequency? ω_o = _____

5. What is the damped natural frequency? ω_d = _____

6. Is the circuit overdamped, critically damped, or underdamped? _____

7. Based on your answers above, what is the mathematical expression for the capacitor voltage $v_c(t)$ for $t > 0$?