R1.1 Derive the Thevenin equivalent voltage and resistance seen by Vout in the circuit below.

![Circuit Diagram]

R1.2 Sketch the asymptotic Bode plot (magnitude and phase) for the following transfer function.

\[ H(s) = \frac{1000(s + 10)}{(s + 100)(s^2 + 2s + 1)} \]

R1.3 Use the follow S&K topology to design a bandpass filter with the following specifications:

- \( h = -20 \)
- \( \omega_n = 100\text{kHz} \)
- \( d = 1/7 \)
R1.4 Derive the CMRR of the following circuit.

R1.5 Given a first order step response, with a rise time $t_r = 100\text{ns}$ and a final value of 1, will a system intended to produce this output be able to, when its slew rate is $20 \text{V/μs}$? What value of $\tau$ will put the step response just at the Slew Rate?

R1.6 Find $I_d$ through the transistor below. $V_{tn} = 1\text{V}$, $\lambda = 0$, $K_n = 60\mu\text{A/V}^2$
R1.7 Using the Constant voltage drop model with \( V_{on} = 0.6 \) V, sketch a plot of \( V_{out} \) vs. time when \( V_{in} = A \sin(\omega_0 t) \).