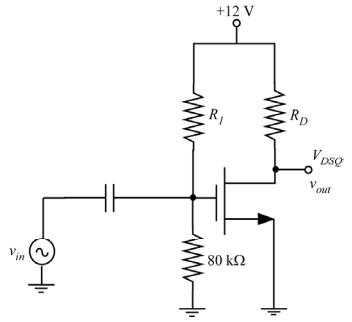
ECE 342: Electronic Circuits **Summer 2026**
Problem Set #5 **Due Date: 5pm, Tue, July 7, 2026**

1. For the MOSFET shown, V_T = 1 V, λ = 0, and $\mu C_{ox}W / 2L$ = 0.1 mA/ V^2. Select R_D and R_1 to result in a midband voltage gain of -4 V/V and V_{DSQ} = 7 V



2. Design a common-gate stage having a midband voltage gain of 10 V/V ± 10% using a load resistance of 5 kΩ and a power supply of 10 V. The input signal is 75 mV peak. The device used has $\mu C_{ox}W / 2L$ =3 mA/V^2, g_{mb} =0.15 g_m mA/V, V_T = 1 V and λ = 0.03/V.

3. The circuit shown is a cascode amplifier. Both devices have values of $\mu C_{ox}W / 2L$ = 0.5 mA/ V^2, V_T = 0.8 V, and λ = 0. Calculate the voltage gain for the circuit. Ignore the body effect.