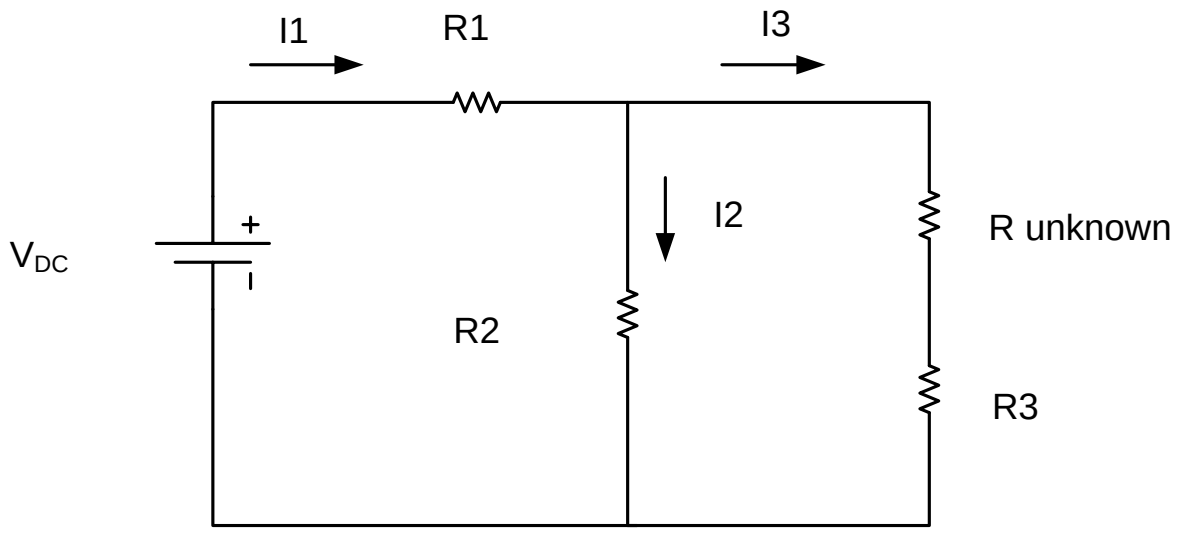
ECE2274
Practice Final Exam B

1. (25 points) Build the circuit below and calculate current by measuring voltage across a known resistor. Find the total current (I_1) and each of the branch circuit currents (I_2) and (I_3). Note: you may need more measurements then just current. Calculate the value of the unknown resistor (given for practice exam). Must show work and include units. Must include units.

V_{DC} = 10V_{DC}, R1 = 220Ω, R2 = 2.7KΩ, R3 = 1KΩ let R unknown = 560 for practice

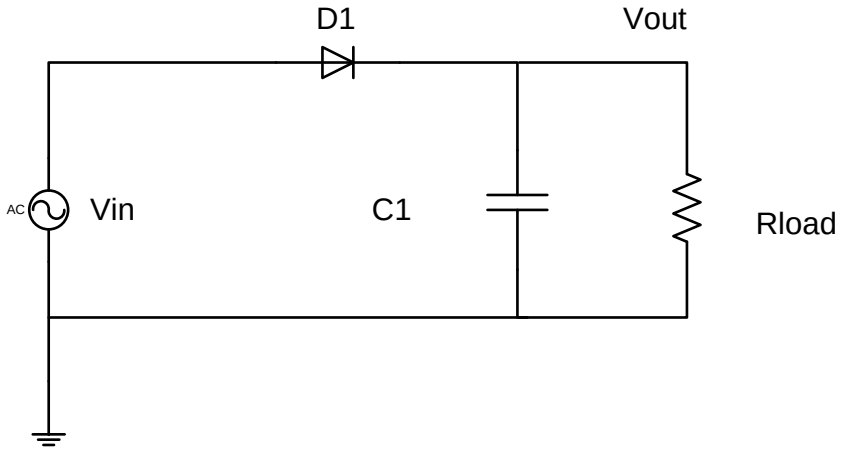
I_1		I_2	
I_3		$R_{unknown}$	



2. Build the circuit below and measure V_{OUT} peak and the V_{RIPPLE} peak to peak with the oscilloscope. Include AC coupled scope capture of V_{RIPPLE}. Measure the actual value of the capacitor. Must include units.

Vin = 10sin(2π 1000t) + 0, C1 = 10uF, Rload = 1KΩ, D1 =1N4001

Vin Frequency in Hz		V_{OUT} peak	
C measured		V_{RIPPLE}	

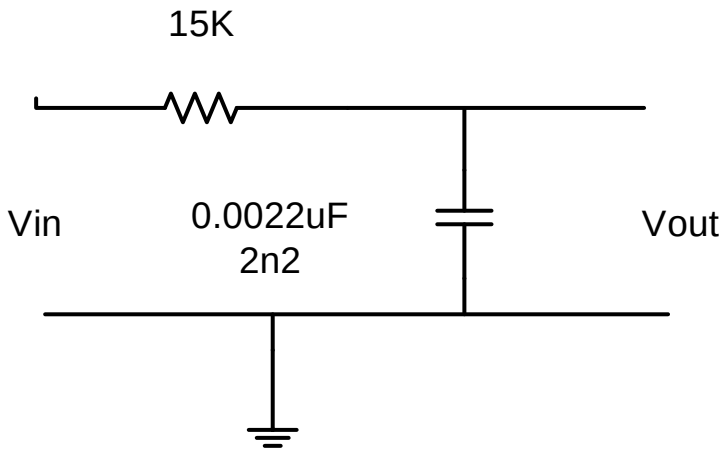


3. RC Circuit

1 build th e RC cicuit run AC sweep from 10 Hz to 300 kHz. Vin = 1Vpp

2. Cutoff break point from the Gain plot

Breakpoint Gain (dB) _____ Frequency _____ Filter Type _____



4 a. Build the circuit below you will need two supplies and using the DC sweep on the computer find the V_{TN} (threshold voltage) by sweeping the Vgs DC supply from 0Vdc to 5Vdc until you observe I_D of 0.1ma for the 2N7000 MOSFET. Must include units. VDD = 12Vdc, Rload = 1KΩ, Vgs = 0V to 5V Include plot. Add a step to plot the Id current in mA. Cannot use a current meter.

V_{TN}	

4 b.(25 points) Also measure V_{DS} and I_{DS} using the meters only for the (off state) V_{GS} = 0V_{DC} and the (on state) V_{GS} = 5Vdc. Must include units. Do not use current meter.

V_{GS}(off)	0 V_{DC}	V_{GS}(on)	5 V_{DC}
V_{DS} (off)		V_{DS} (on)	
I_{DS} (off)		I_{DS} (on)	

VDD = 12Vdc, Rload = 1.5KΩ, Vgs = variable