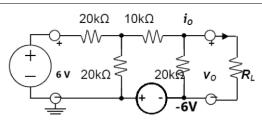## Lab. Test Questions: ECE101 Spring 2025

Note: You will get randomly one among these questions based on blind draw during lab-exam day. No extra details will be given.

I	Assemble an ASTABLE circuit using 555 IC with output frequency close to 10 kHz and duty ratio = around 0.7 (within ± 20% accuracy). The following component values will be made available to you: C = 0.01 micro-farad, R = 1k, 4.7k, 5.1 k. Choose +5 volt and ground as supply. Draw (manually) the output waveform as seen on DSO. Mark the time and voltage scales clearly (must show the zero voltage lines).
2	Find component values and assemble the circuit for 555 Monostable with ON time (2± 20%) second. Connect an LED with suitable series resistance at output of 555 IC. Choose C= 100 micro-Farad (note: +/- polarity on electrolytic capacitor). Use LDR based potential divider circuit to feed to trigger input of 555 IC (Find, before-hand, the dark state and bright state resistances of LDR). Note: In lab mini project you had used IR sensor for this application (use same concept) .
3	You are given an inductor with some internal series resistance (r_L). L = 1 milli-Henry (approximately). Make a resonant circuit to estimate the magnitude of equivalent 'r_L' at around 16 kHz frequency. Compare this estimated value with resistance measured using a digital multi-meter. Apart from the given inductor and DSO with wave generator, you are given a ceramic capacitor of 0.1 micro-farad and resistors of 1 kΩ and 10kΩ.
4	Make a band pass filter with $C_1 = C_2 = 0.01$ micro-farad and $R_1 = R_2 = 47$ k-Ohm. Find the experimental values for center frequency, gain at center frequency and bandwidth of filter. Compare these values with the theoretical values.
5	Assemble the circuit given (feeding load R_L). Experimentally find the magnitudes of R_{th} and V_{th}. Verify the circuit by connecting five different values of R_L (varying from 0.5 R_{th} to 2 R_{th}. Plot P_{load} vs R_L and graphically estimate R_L for maximum power.
6	Make a regulated dc power supply of +5 V magnitude using given 220V/(12-0-12)V step down transformer, 4 diodes, 1000 micro-farad electrolytic capacitor, 0.1 micro-farad ceramic capacitor, one LED and 1 k-Ohm resistor and 7805 voltage regulator IC.
7	Find component values for 555 Monostable with ON time (2± 20%) second. Choose C= 47 micro-Farad (note: +/- polarity on electrolytic capacitor). Make the Monostable using given IR sensor circuit. Connect 5 volt and ground as supply.
8	Make an op-amp based integrator circuit to get a triangular waveform of 500 Hz with magnitude varying from -2V to +2V (within +/-20% accuracy). Use wave-generator of DSO to give square wave input. You are given an op-amp, a capacitor of 0.1 micro-farad and two resistors of 10 kΩ and one resistor of 200 kΩ.