EEL1010 Introduction to Electrical Engineering

Lab Report

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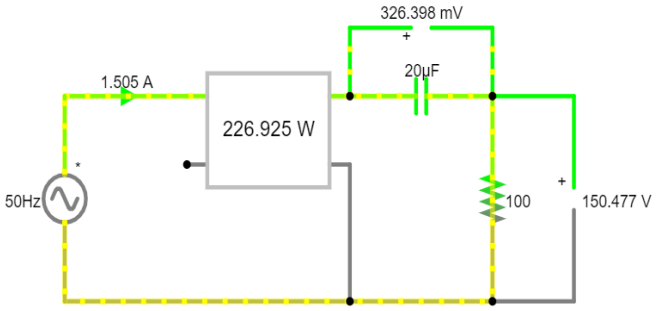
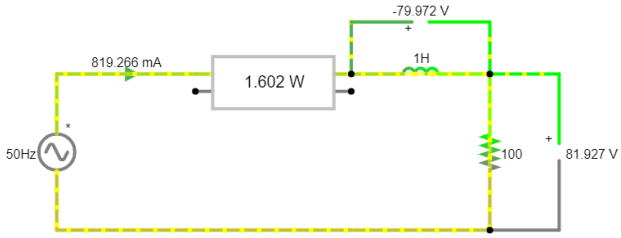
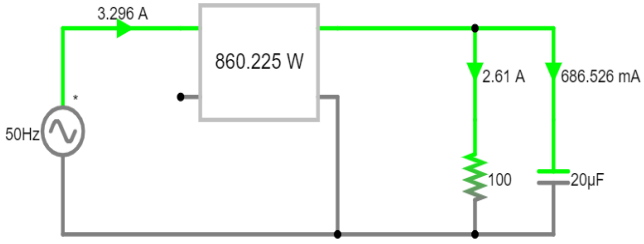
Roll Number	B21EE035
Experiment No	03
Experiment Title	Verification of KVL in RL and RC AC Circuits

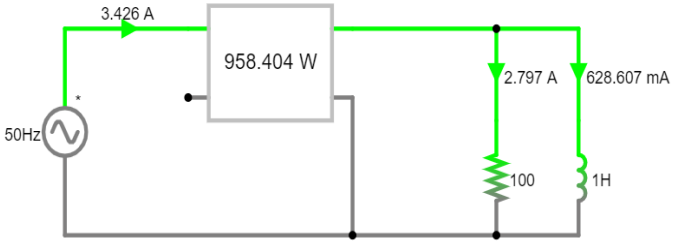
Objective:- To verify KVL and find power factor in R-L and R-C series AC circuits.

Circuit Diagram:-

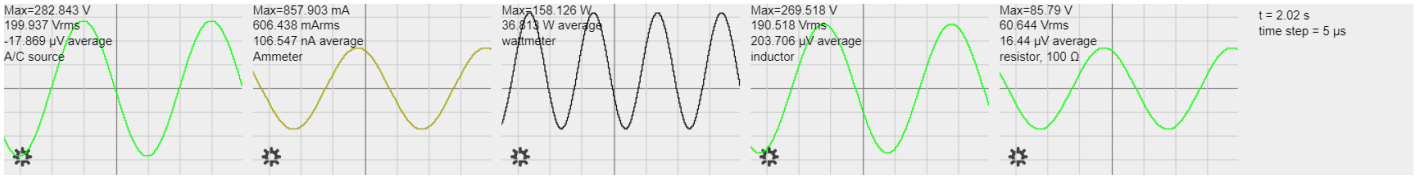




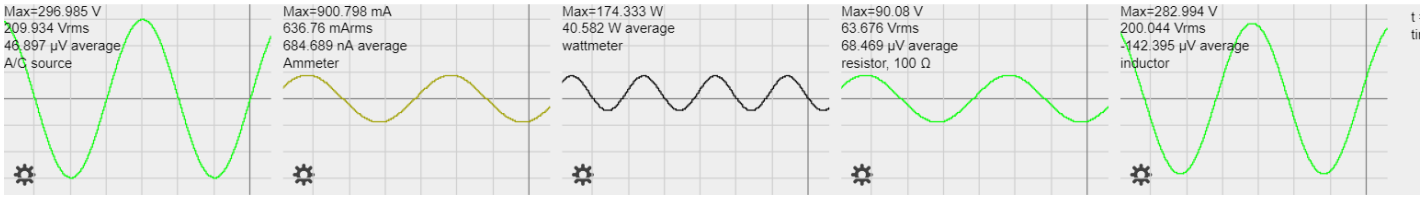




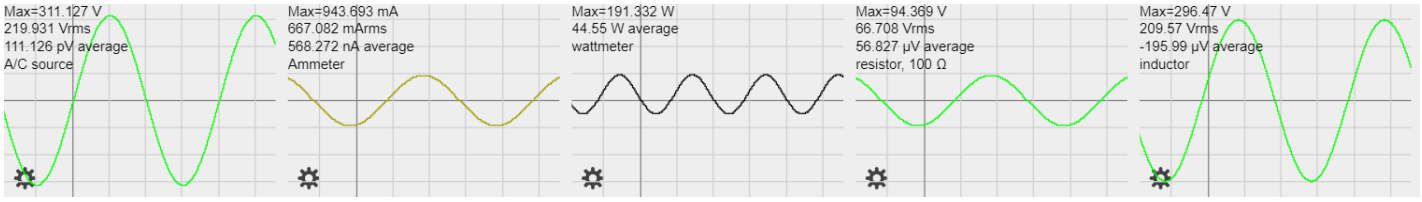
Experiment 1(R-L Series Circuit)
Falstad simulation readings



At 200V



At 210V

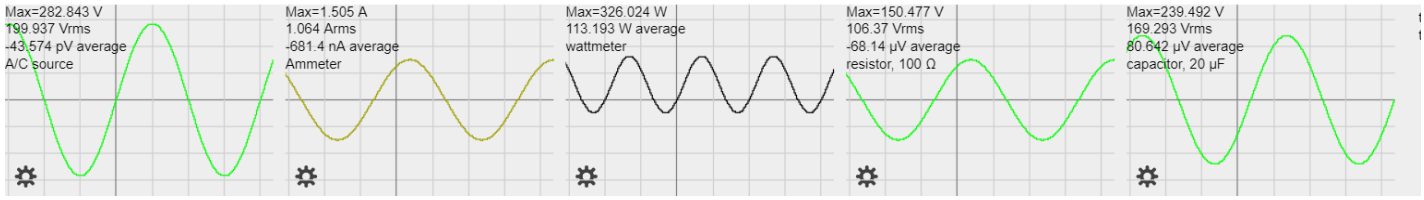


At 220V

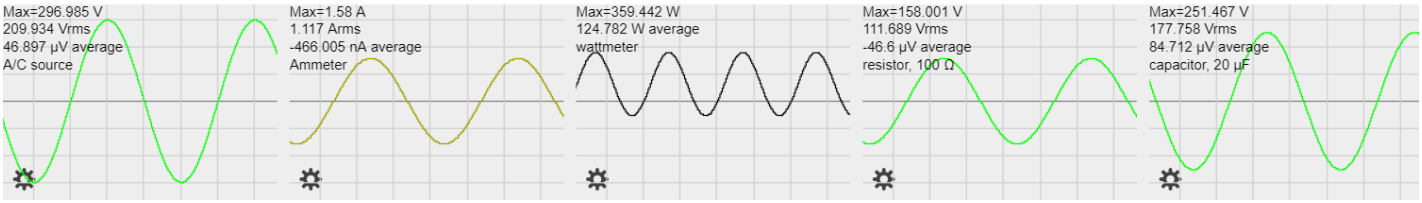
Calculations:-

S. No.	Variac V_S	V_L	V_R	I	W	Calculated $V=\sqrt{V_L^2+V_R^2}$	Power factor (Measured) $\cos\phi = \frac{W}{(VsI)}$	Power factor (Measured 2) $\cos\phi = \cos[\tan^{-1}(\frac{V_L}{V_R})]$	Power factor (Measured 3) $\cos\phi = \frac{V^2+V_R^2-V_L^2}{2V.V_R}$
1.	200	190.5	60.644	0.606	36.781				
2.	210	200.0	63.673	0.636	40.582				
3.	220	209.5	66.70	0.667	44.55				

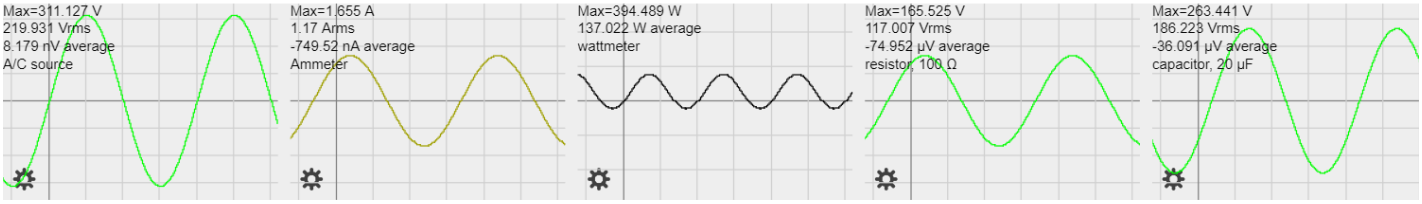
Experiment 2(R-C Series Circuit)
Falstad simulation readings



210V reading



210 V reading

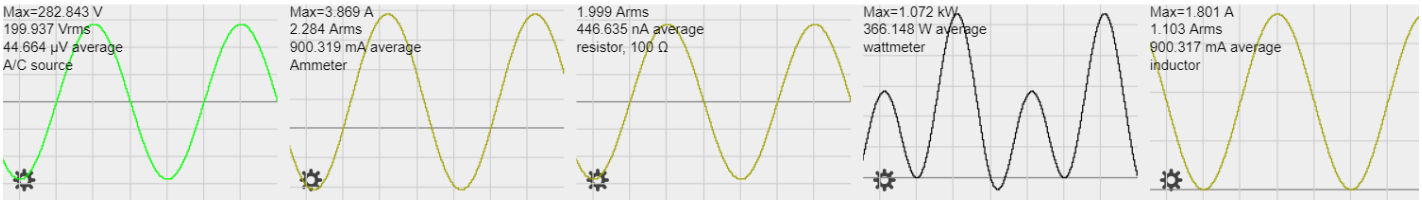


220V reading

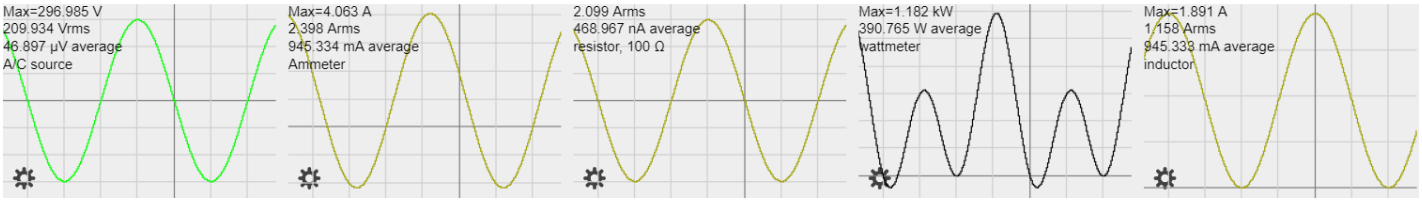
Calculations:-

S. No.	Variac V_S	V_C	V_R	I	W	Calculated $V=\sqrt{V_C^2 + V_R^2}$	Power factor (Measured) $\cos\phi = \frac{W}{(VsI)}$	Power factor (Measured 2) $\cos\phi = \cos[\tan^{-1}(\frac{V_C}{V_R})]$
1.	200	169.29	106.37	1.064	113.24			
2.	210	177.75	111.68	1.117	124.78			
3.	220	186.32	117.07	1.171	137.16			

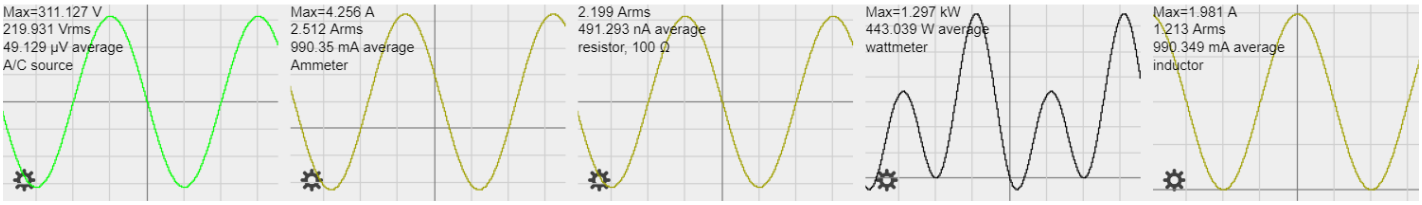
Experiment 3 (R-L Parallel Circuit)
Falstad simulation readings



200V



210 V

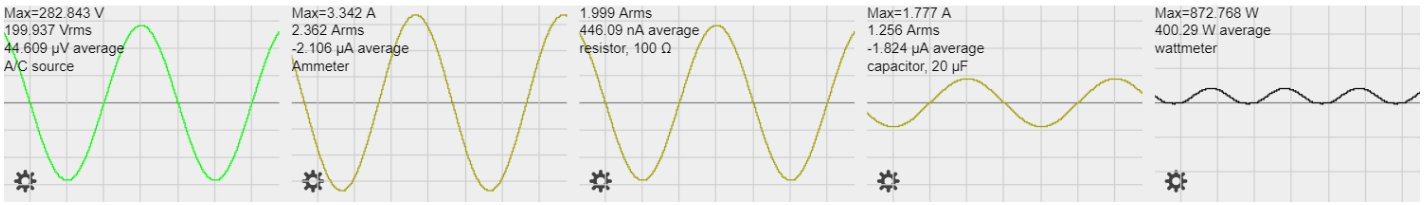


220 V

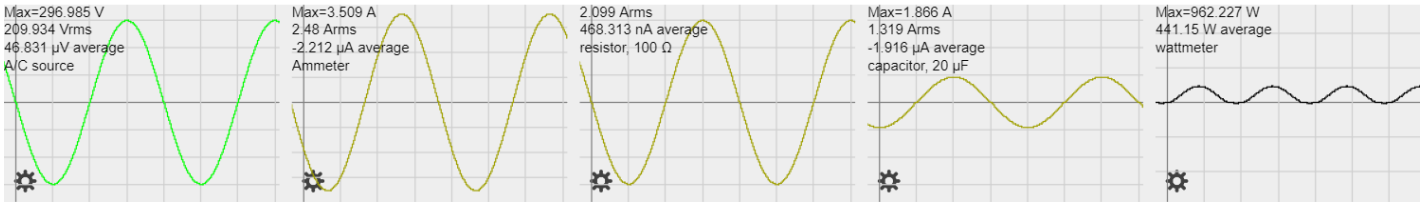
Calculations:-

S. No.	Variac V_S	I	I_L	I_R	W	Calculated $I=\sqrt{I_L^2 + I_R^2}$	Power factor (Measured) $\cos\phi = \frac{W}{(VsI)}$	Power factor (Measured 2) $\cos\phi = \frac{I_R}{I}$
1.	200	2.284	1.103	1.999	372.84			
2.	210	2.398	1.158	2.099	411.05			
3.	220	2.512	1.213	2.199	451.13			

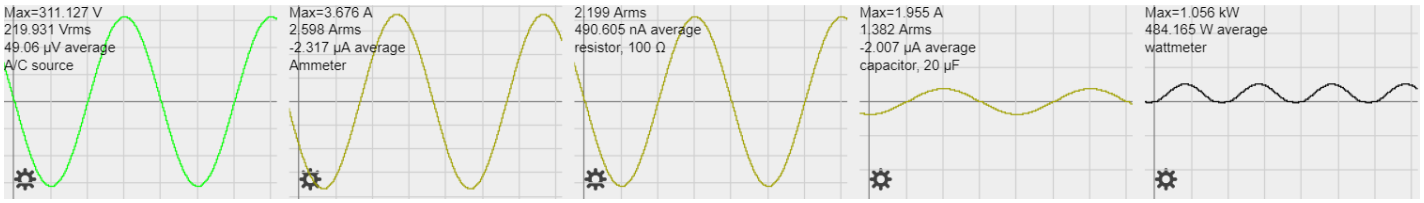
Experiment 3 (R-C Parallel Circuit)
Falstad simulation readings



200V



210V



220V

Calculations:-

S. No.	Variac V_s	I	I_C	I_R	W	Calculated $I=\sqrt{I_C^2 + I_R^2}$	Power factor (Measured) $\cos\phi = \frac{W}{(VsI)}$	Power factor (Measured 2) $\cos\phi = \frac{I_R}{I}$
1.	200	2.362	1.256	1.999	400.29			
2.	210	2.48	1.319	2.099	441.15			
3.	220	2.598	1.382	2.199	484.165			