

Prelab – Experiment 4

The Oscilloscope

Read the lab instruction sheet and the Tektronix oscilloscope tutorial thoroughly. A pdf of the tutorial is available on the course website under Laboratory Equipment/MSO2014 Oscilloscope Tutorials/Basic-Scopes/Basic-Scopes-Lab.pdf (direct link: https://www.physics.wisc.edu/courses/home/fall12022/321/lab_equipment/MSO2014_scope_tutorials/Basic-Scopes/Basic-Scopes-Lab.pdf)

Important: Please have the tutorial in hand when you arrive at lab, either the electronic pdf on a computer or other device, or a printed copy.

1 Question 1

Show that the root-mean-square (rms) of a sinusoidal voltage source $V(t) = V_0 \sin(\omega t)$ is $V_{rms} = V_0/\sqrt{2}$. The rms for quantity $A(t)$ is defined as $A_{rms} = \sqrt{\frac{1}{T} \int_0^T A^2 dt}$, where T is the period of the sinusoid.

2 Question 2

Calculate the (a) peak-to-peak amplitude, (b) period, T , in ms, and (c) angular frequency, ω , of 120 V AC power grid voltage in the U.S.