EXPERIMENT- 9

Study the Root-Mean-Square(RMS), Peak, and Peak-to-Peak Values, Measurements with Oscilloscope

AIM

To study the Root-Mean-Square(RMS), Peak, and Peak-to-Peak Values, Measurements with Oscilloscope

APPARATUS USED

Oscilloscope

Function Generation

Digital Multi-Meter

Capacitor 1uF,10uF

Resistance 100 ohm

Breadboard

THEORY

V_P : The maximum instantaneous value of a function as measured from the zero-volt level. For the waveform shown above, the peak amplitude and peak value are the same, since the average value of the function is zero volts.

V_{P-P} The full voltage between positive and negative peaks of the waveform; that is, the sum of the magnitude of the positive and negative peaks.

V_{rms} : The root-mean-square or effective value of a waveform.

V_{avg} : The level of a waveform defined by the condition that the area enclosed by the curve above this level is exactly equal to the area enclosed by the curve below this level.

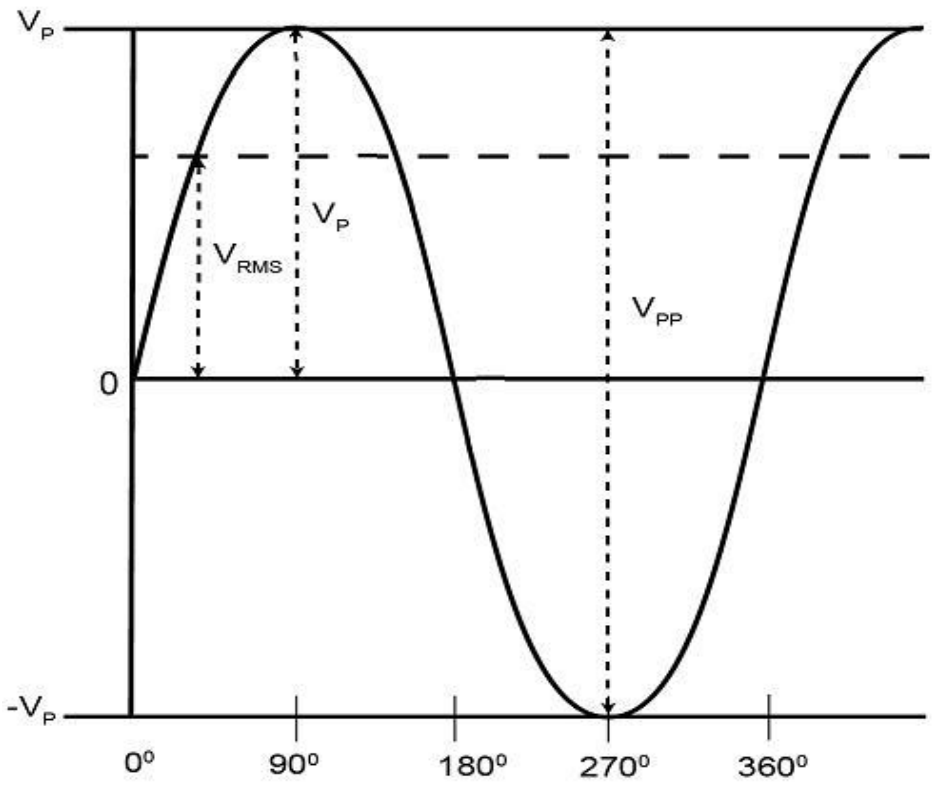
FORMULA USED

$$VP - P = 2 . VP$$

$$VP - P = 2 \sqrt{2} . V rms = 2.828 . V rms$$

$$VP - P = . V avg = 3.141 . V avg$$

GRAPH



OBSERVATION TABLE

Vrms (volts)	Vp-p (volts)
5	14.142
10	28.284
12	33.940799999999996

Vpeak (volts)	Vp-p (volts)
5	10
10	20
12	24

Vavg(volts)	Vp-p(volts)
5	15.707963267948966
10	31.41592653589793
12	37.69911184307752

OUTPUT

RMS VOLTAGES(Vrms)

5 volts

10 volts

12 volts

PEAK VOLTAGES(Vp)

5 volts

10 volts

12 volts

Inputs

Peak Voltage (VP) | 12 | Volts

Calculate

Output

Voltage Peak-to-Peak (V_{P-P}) | 24 | Volts

AVERAGE VOLTAGES(Vavg)

5 volts

Inputs

Average Voltage (Vavg) | 5 | Volts (V)

Calculate

Output

Voltage Peak-to-Peak (V_{P-P}) | 15.707963267948966 | Volts (V)

10 volts

Inputs

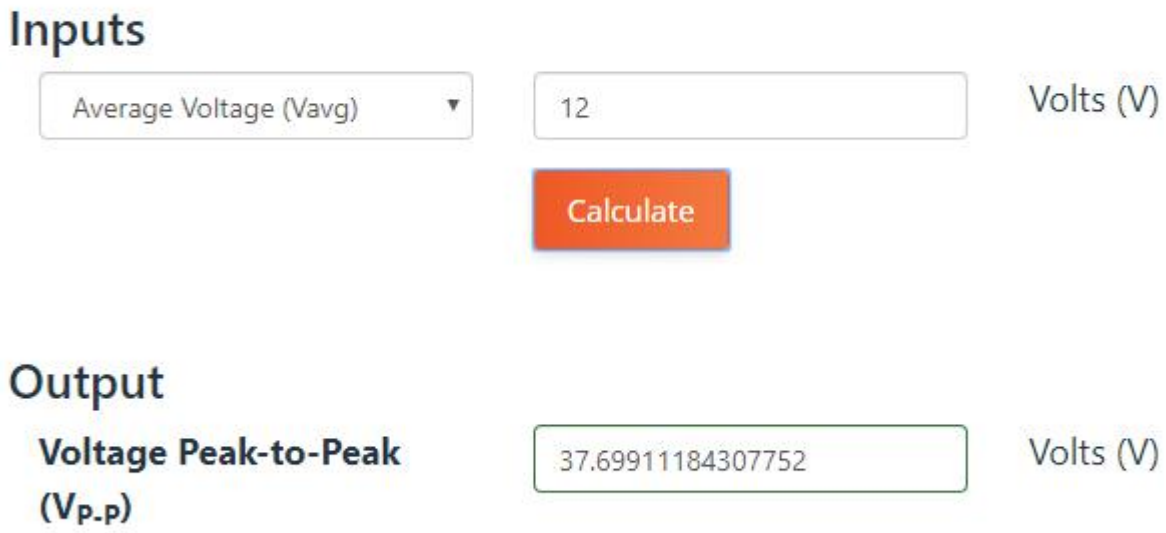
Average Voltage (Vavg) ▾ | 10 | Volts (V)

Calculate

Output

Voltage Peak-to-Peak (V_{P-P}) | 31.41592653589793 | Volts (V)

12volts



RESULT

Studied the Root-Mean-Square(RMS), Peak, and Peak-to-Peak Values, Measurements with Oscilloscope and their relation with each other.