

Basic Electronic Circuits Lab

(IEC-103)

Experiment-07

Objective

To build half wave and full wave rectifier with and without capacitor filter.

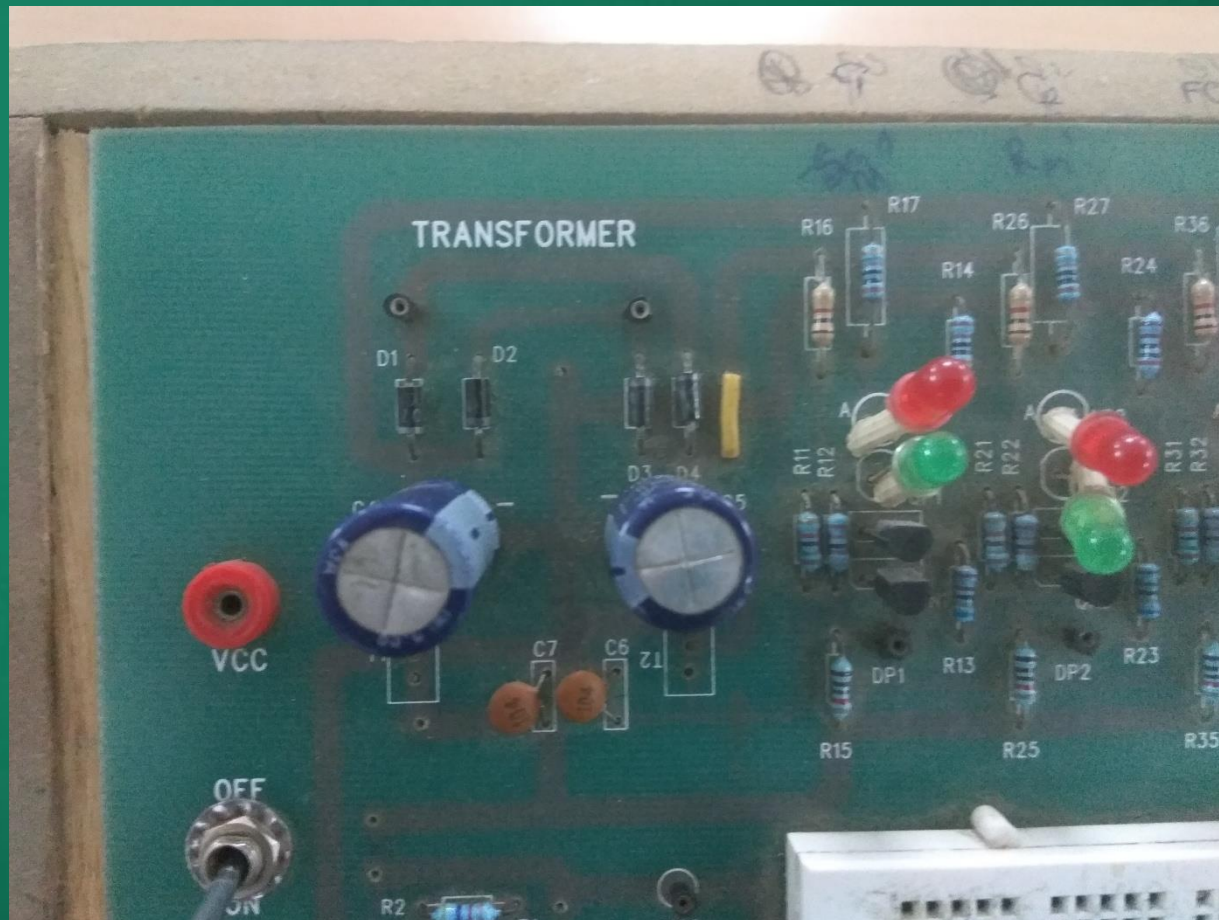
Components

- **Transformer**
- **Diodes (4), Resistances (10 K Ω and 4.7 K Ω), Capacitors (10 μ F, 20 μ F, 100 μ F, 330 μ F)**
- **Breadboard**
- **Connecting wires**

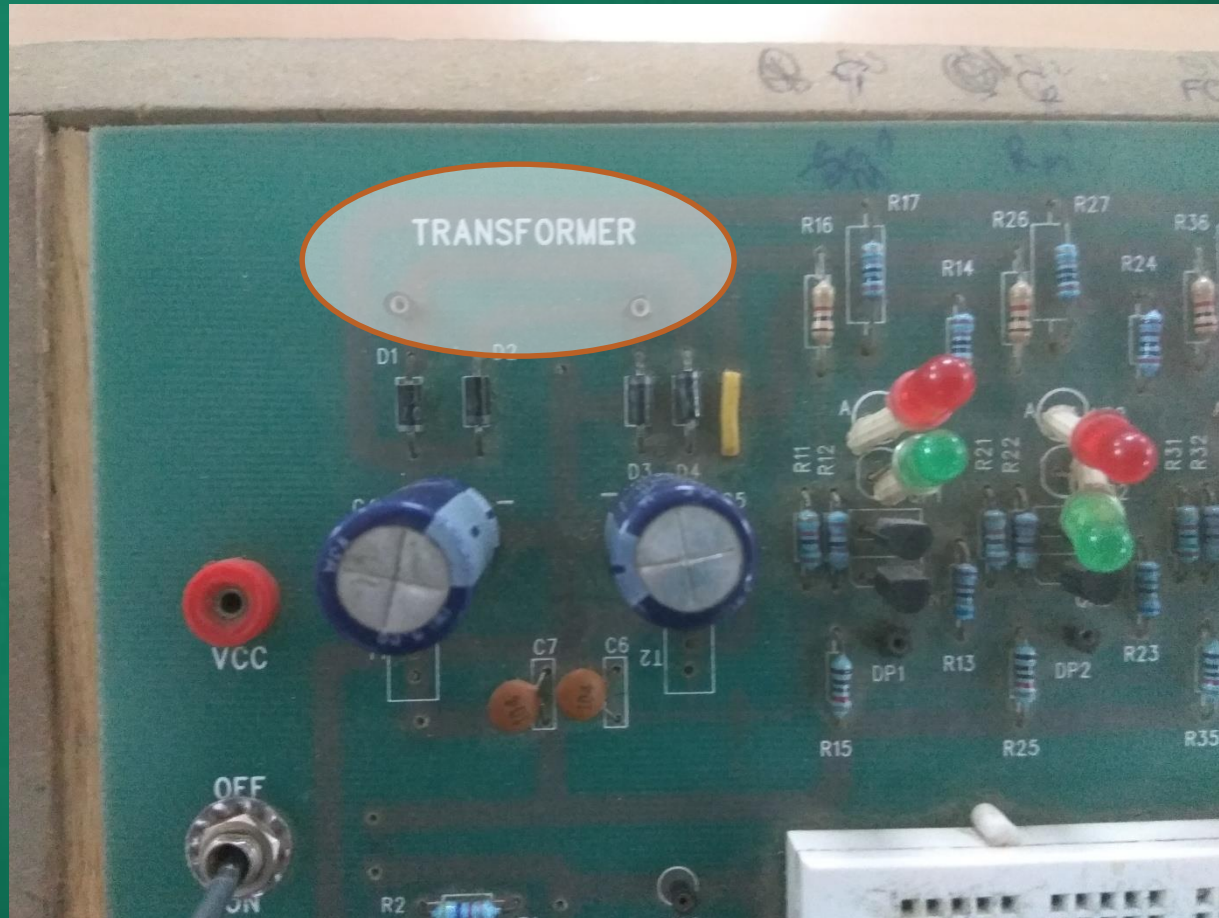
Equipment

CRO for input and output voltage measurements.

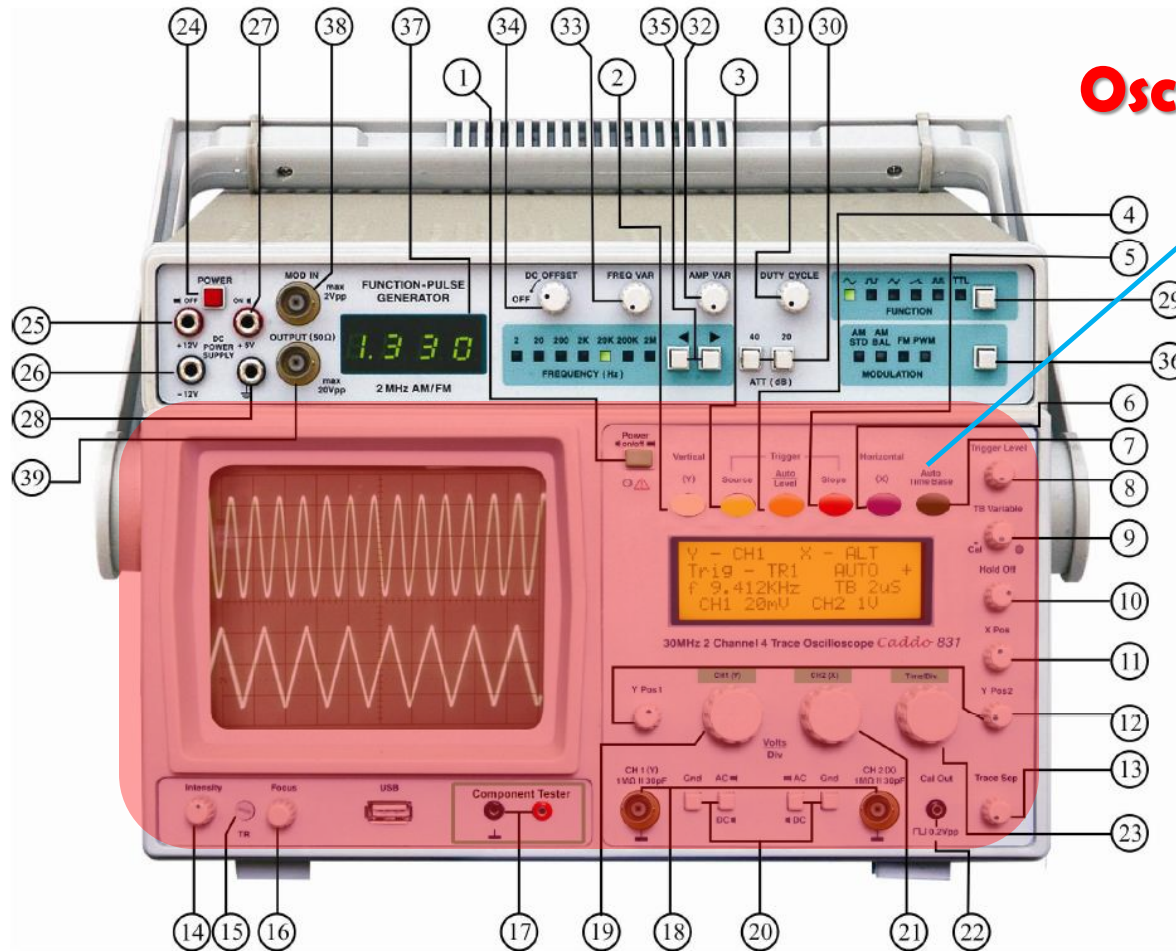
Secondary Terminals of Transformer



Secondary Terminals of Transformer

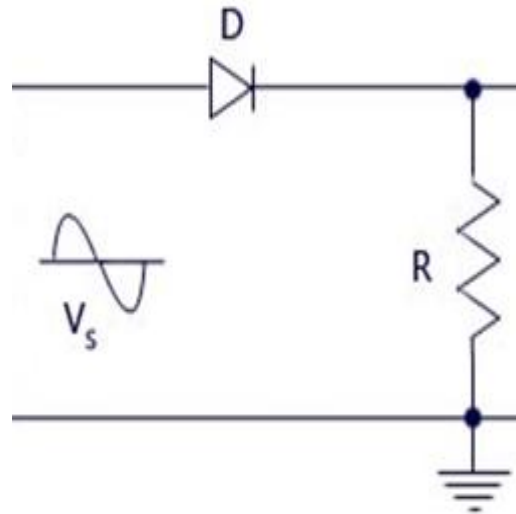


Oscilloscope



Oscilloscope

Half Wave Rectifier

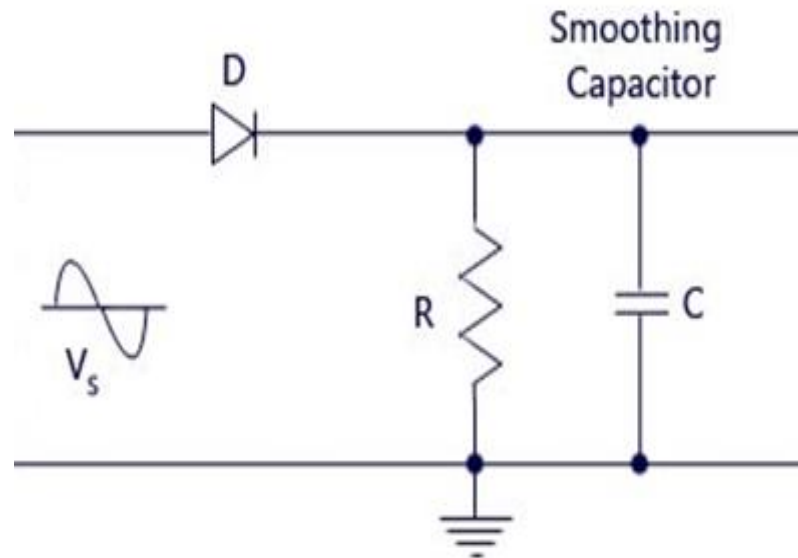


$$\gamma = \frac{V_{ac}}{V_{dc}} = \frac{\sqrt{\left(\frac{V_m}{2}\right)^2 - \left(\frac{V_m}{\pi}\right)^2}}{\left(\frac{V_m}{\pi}\right)} = \frac{\sqrt{\pi^2 - 4}}{2} = 1.21$$

Observations

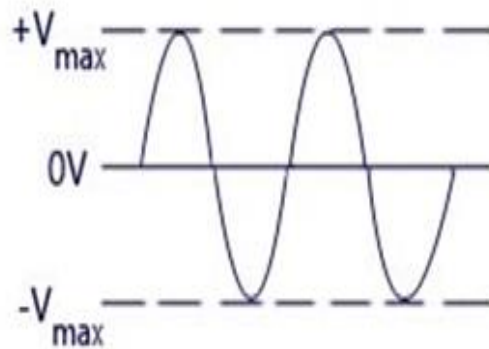
Sr. No	R_L	V_{MAX}	V_{RMS}	V_{DC}	Ripple factor (γ)
1	10 k Ω				
2	4.7 k Ω				

Half Wave Rectifier With Filter

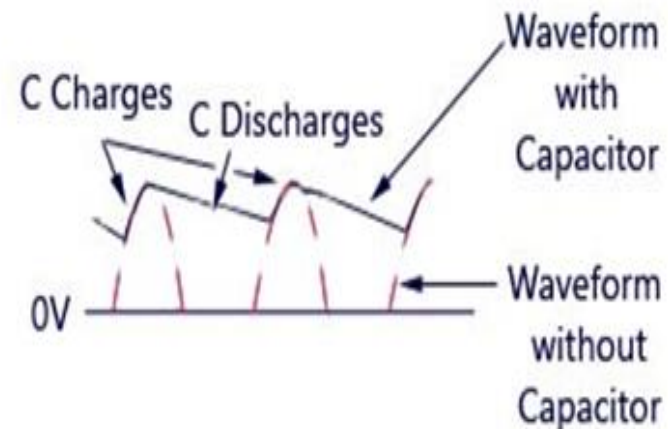


$$\gamma = \frac{1}{2 f R C \sqrt{3}}$$

Half Wave Rectifier With Filter



AC Input Waveform

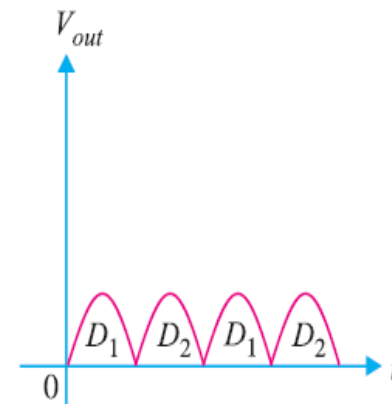
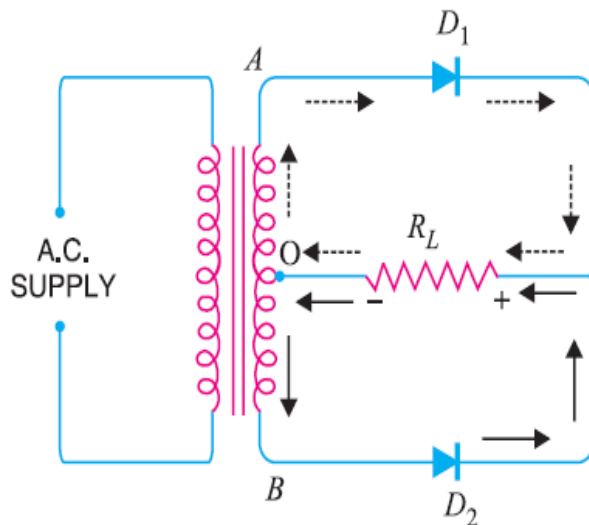


Resultant Output Waveform

Observations

Sr. No	C	V_{p-p} (ripple) (V)	$V_{AC} =$ $V_{p-p(ripple)} / 2\sqrt{3}$	V_{DC} (V)	$\gamma \approx V_{AC}/V_{DC}$	$\gamma =$ $1/(2fCR_L\sqrt{3})$
1	10 μ F					
2	22 μ F					
3	50 μ F					
4	100 μ F					
5	330 μ F					

Full Wave Rectifier

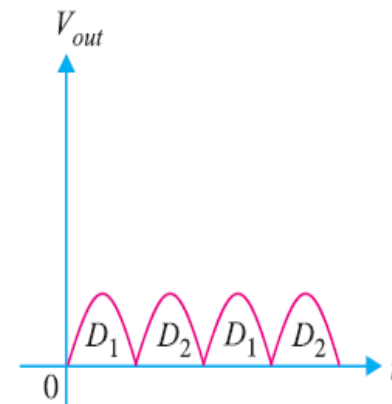
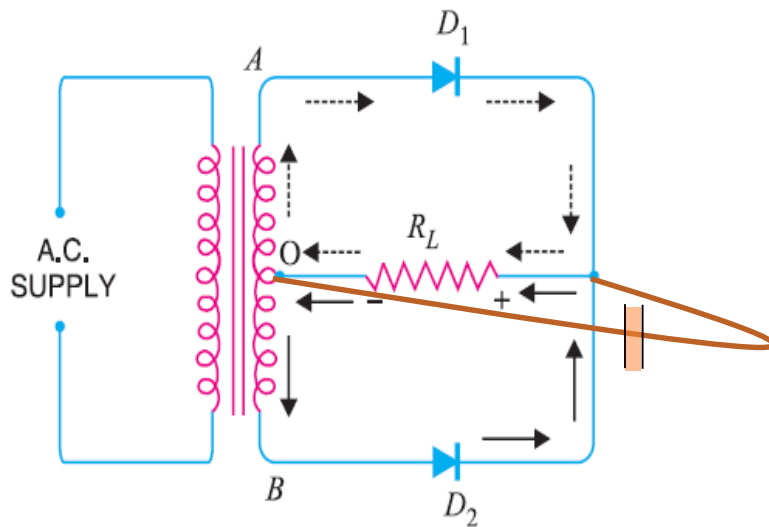


$$\gamma = \frac{V_{ac}}{V_{dc}} = \frac{\sqrt{\left(\frac{V_m}{\sqrt{2}}\right)^2 - \left(\frac{2V_m}{\pi}\right)^2}}{\left(\frac{2V_m}{\pi}\right)} = \frac{\sqrt{\pi^2 - 8}}{2\sqrt{2}} = 0.48$$

Observations

Sr. No	R_L	V_{MAX} (V)	V_{RMS} (V)	V_{DC} (V)	Ripple factor (γ)
1	10 k Ω				
2	4.7 k Ω				

Full Wave Rectifier With Filter



$$\gamma = \frac{1}{4 f R C \sqrt{3}}$$

Observations

Sr. No	C	V_{p-p} (ripple) (V)	$V_{AC} = V_{p-p(ripple)} / \sqrt{3}$ (V)	V_{DC} (V)	$\gamma \approx$ V_{AC}/V_{DC}	$\gamma =$ $1/(2fCR_L \sqrt{3})$
1	10 μF					
2	22 μF					
3	50 μF					
4	100 μF					
5	330 μF					