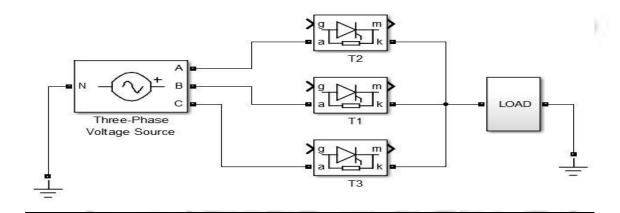# Experiment No.- 5

Objective of the Experiment: **To Study the 3-Phase Half Wave Rectifier with R and Motor load.**

Equipment Needed:

1. Scientech 2700 Trainer Kit.
2. Resistor and Motor Load.
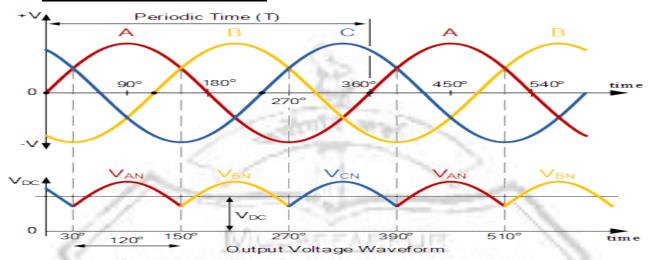3. Patch Cords.
4. DSO.

Circuit Diagram:

Note: Gate pulse will be given by firing circuit unit internally.

Procedure:

1. Make the connections as per the given circuit diagram.

2. Give the gate pulses from the firing circuit unit to the SCR assembly carefully.

3. Connect the given resistor and then motor load.

4. Connect the DSO probe and multi-meter across the load.

5. Make sure the connections are **OK** and patch cords are **not loose**.

6. Switch on the main supply**.**

7. Vary the firing angle and take the required readings from the DSO and multi-meter.

8. Calculate the desired result from the observed data.

Desired Output Voltage Waveform:

Observation Table:

$V_{peak,phase}\ (V_{mp}) = \quad\quad V$					
Sl No.	Firing Angle (α^0)	Extinction Angle (β^0)	Conduction Angle (γ^0)	Average Output Voltage (V_O) (Volt)	% Error
				V_O(Meas.) | V_O(Cal.)	
1.					
2.					
3.					
4.					
5.					

Calculations:

For Resistive Load:

- **Calculation for average output voltage (for $\alpha \leq 30^0$)**

$$V_o = \frac{3\sqrt{3}}{2\pi} V_{mp}\ COS\alpha$$

- **Calculation for average output voltage (for $\alpha > 30^0$)**

$$V_o = \frac{3}{2\pi} V_{mp}\ (1 + COS(30 + \alpha))$$

For Motor Load

- **Calculation for average output voltage**

$$V_o = \frac{3\sqrt{3}}{2\pi} V_{mp}\ COS\alpha$$

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