SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF MECHATRONICS

19MCB302– INDUSTRIAL ELECTRONCIS & APPLICATION

III YEAR V SEM

UNIT 1 – PHASE CONTROLLED CONVERTERS

TOPIC –Single Phase controlled Rectifier

Mr. M.Anand., M.E.,(Ph.D.,)

ASSISTANT PROFESSOR,

DEPARTMENT OF MECHATRONICS,

SNSCT, Coimbatore.

APPLICATION

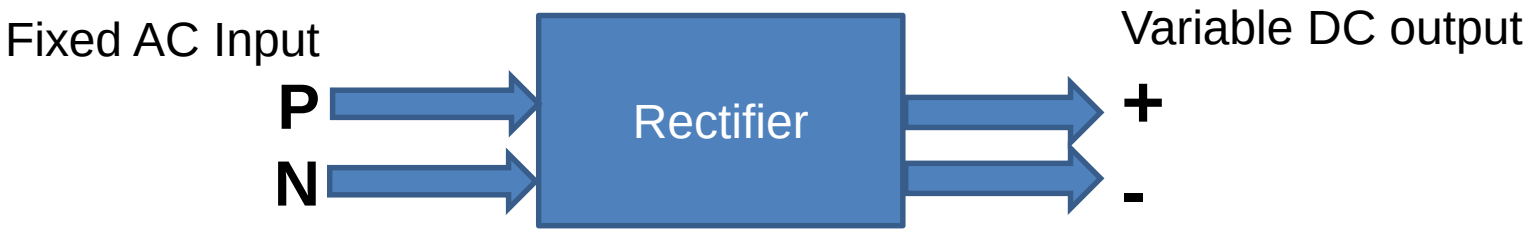
SPEED CONTROL OF DC MOTORS BY USING RECTIFIER

By changing ***the voltage or current*** value in the ***field or armature*** of the DC Motor

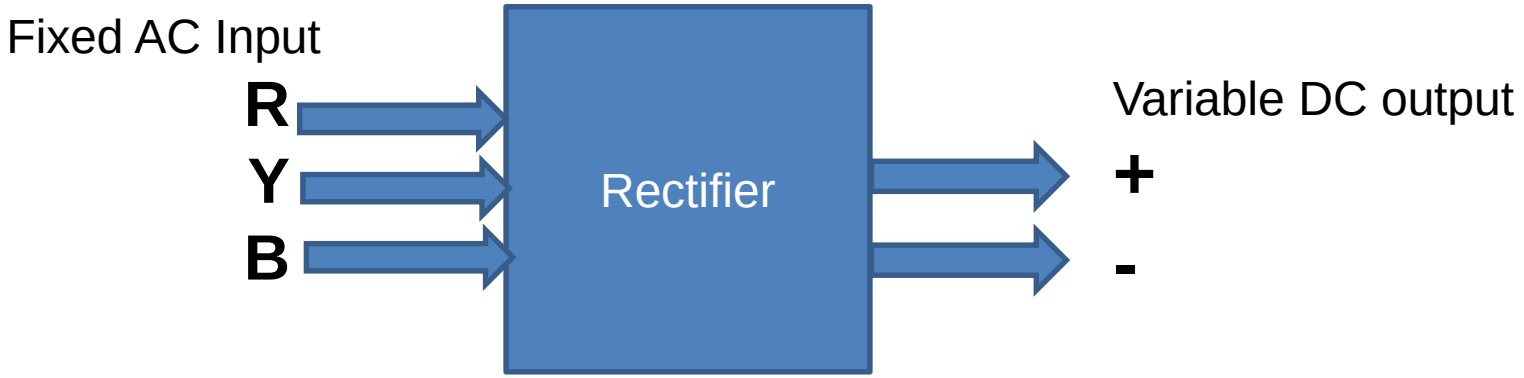
DC Series Motor
DC Shunt Motor

Rectifier is a device which is used to convert the Fixed AC into Variable (Controlled DC)

RECTIFIER-Single Phase



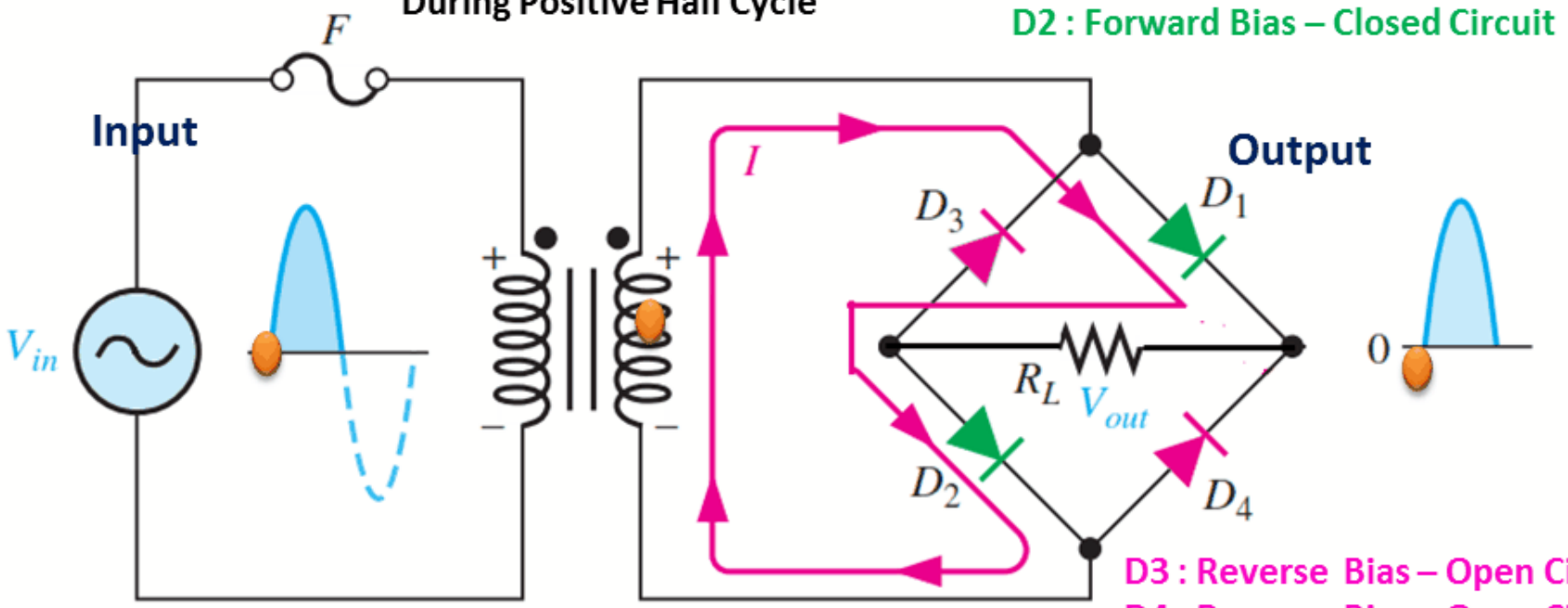
RECTIFIER-Three Phase



Bridge Full Wave Rectifier

During Positive Half Cycle

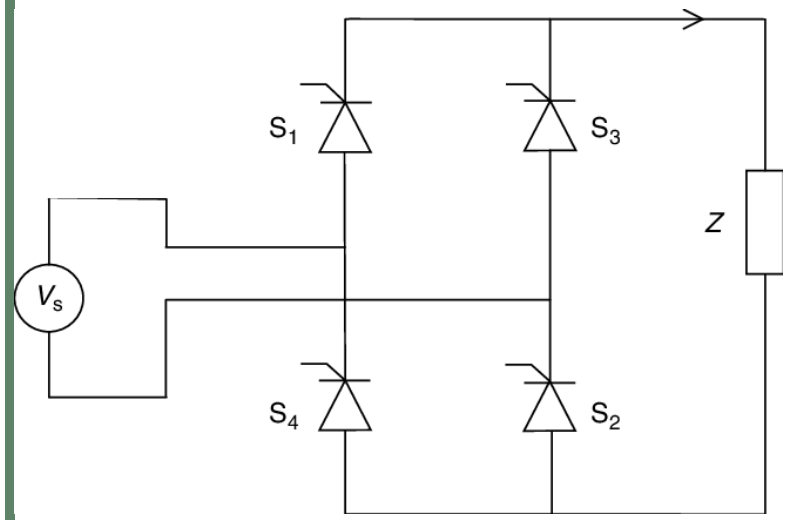
D1 : Forward Bias – Closed Circuit
D2 : Forward Bias – Closed Circuit



D3 : Reverse Bias – Open Circuit
D4 : Reverse Bias – Open Circuit

EngineeringTutorial.com

Single phase controlled Converter

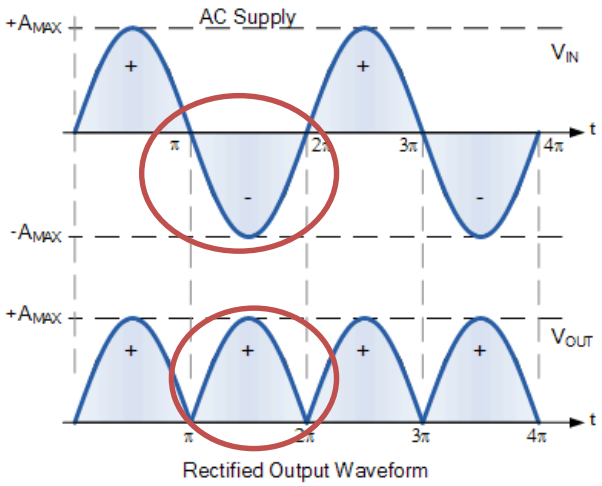


4 SCRs ⇒ **controlled converter**

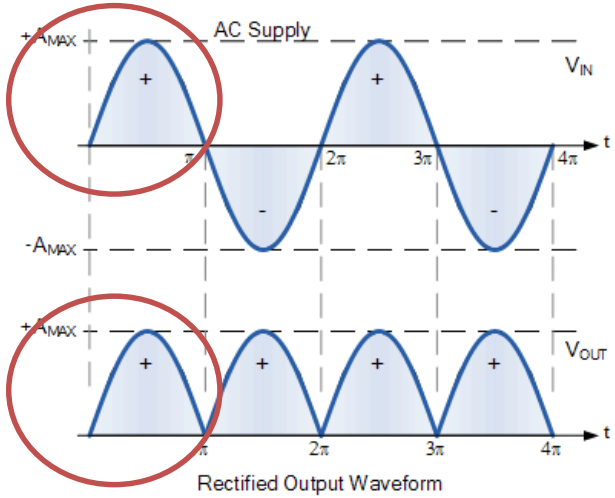
Input ⇒ **Single phase AC**

Output ⇒ **controlled DC**

Uncontrolled Rectifier



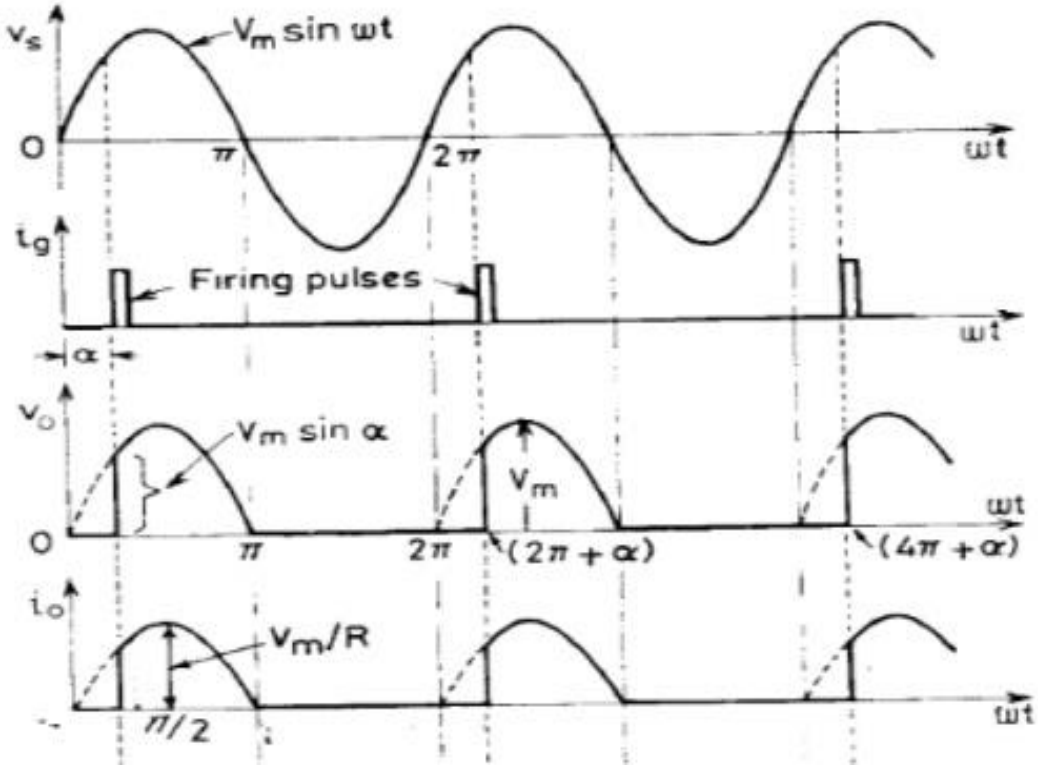
Rectified Output Waveform



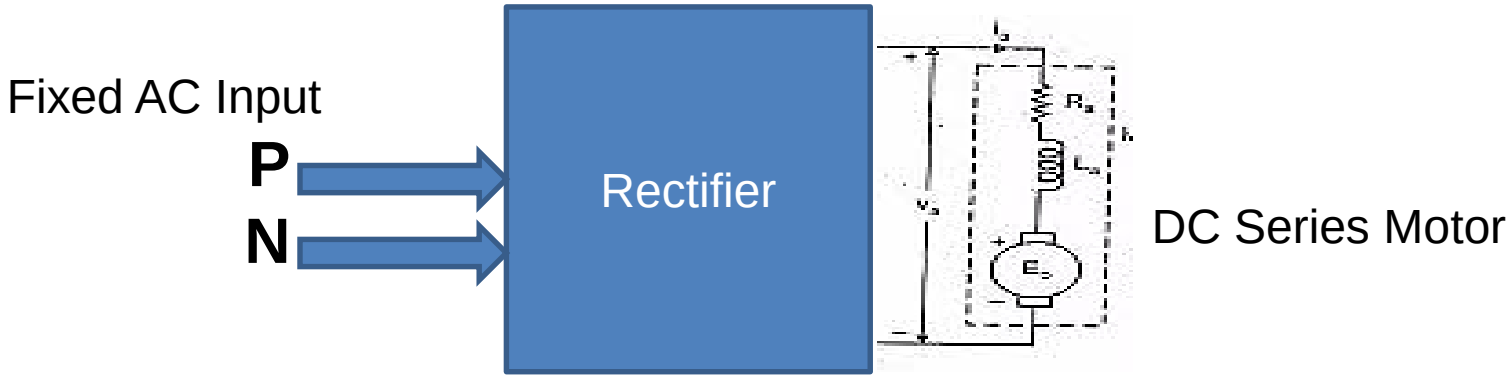
Rectified Output Waveform

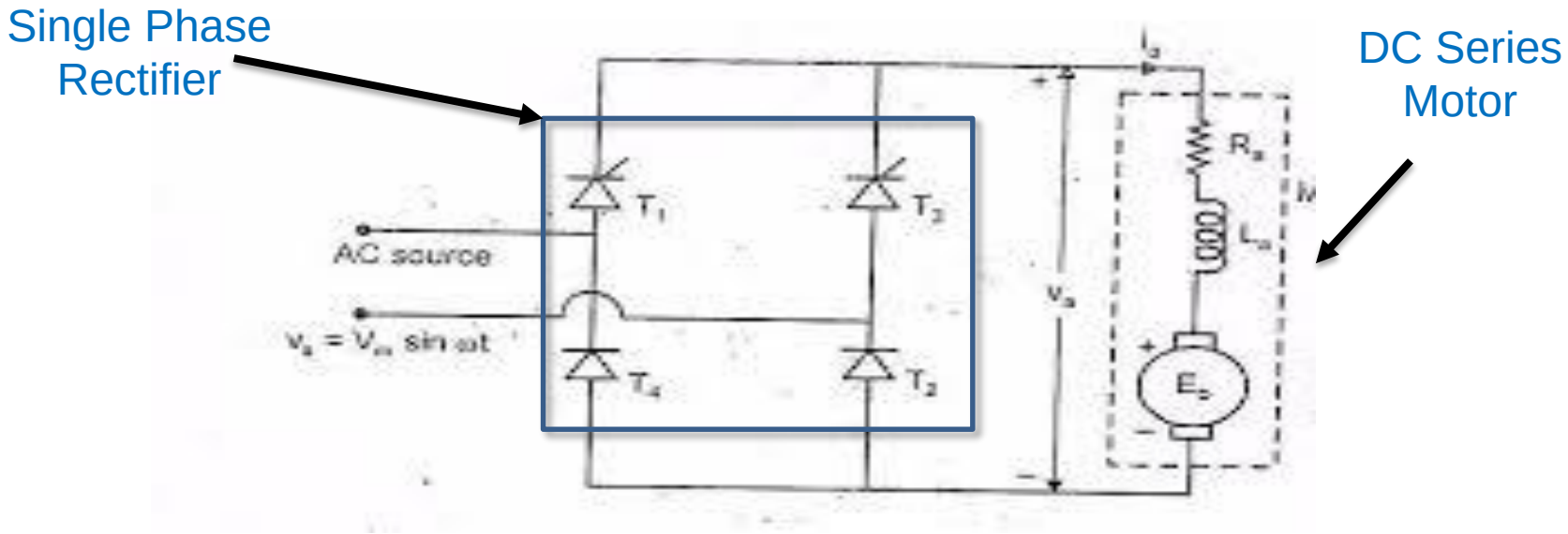
Controlled Rectifier

Waveforms



Speed control of DC Motor (Series) by Single phase RECTIFIER





Working

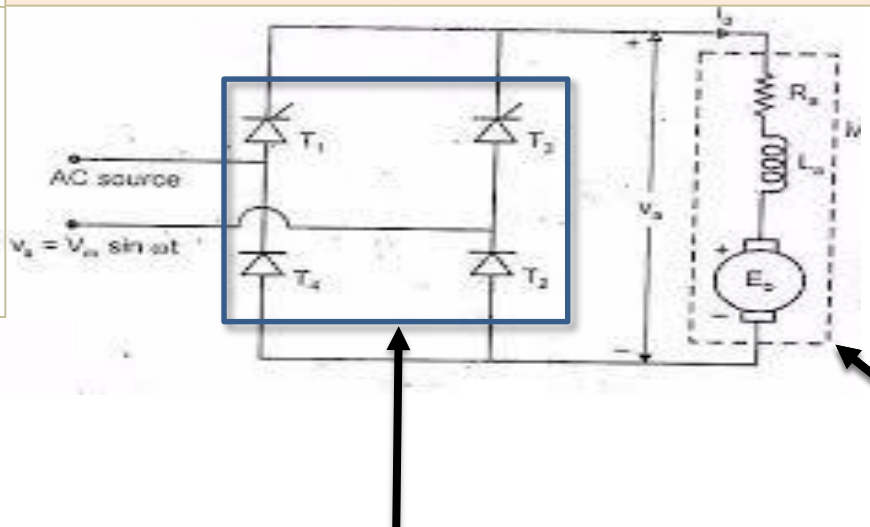
Speed control of DC Motor (Series) by Single phase RECTIFIER

Firing Angle

0 to 90 degree phase shit rectangle pulse – Generated by Function generator

Input

230 V
AC Supply
50 Hz
P, N



Output

0-230 V
DC Supply
+.-

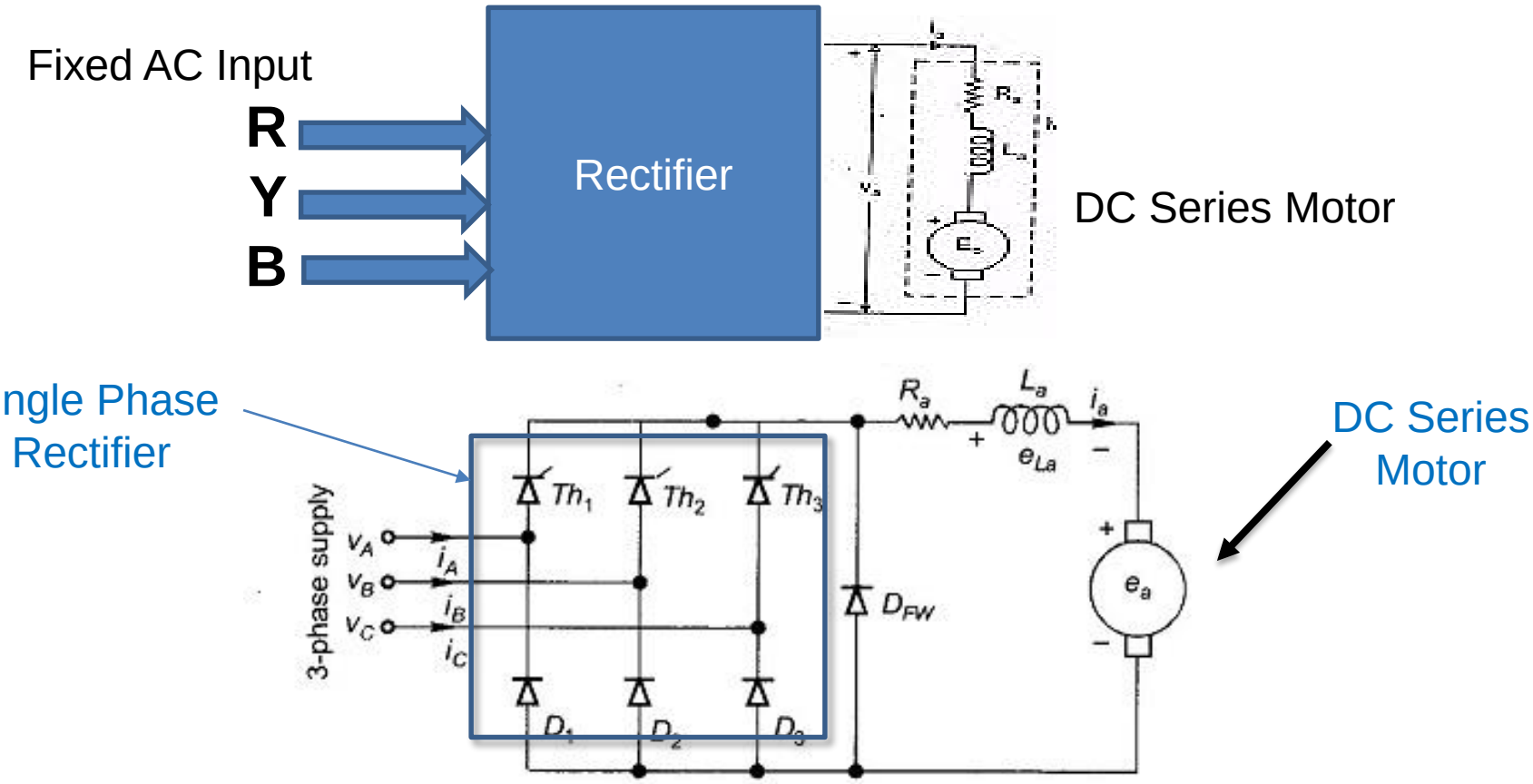
How SCR Works

For SCR operation, We have to give the Firing angle (Small amount of voltage) Given to the SCR

- Single Phase Rectifier consist of 4 SCRs named T1, T2, T3 and T4
- It Converts the AC Volt into DC Volt *(As Like Bridge Diode Rectifier Principle)*
- *Output Voltage controlled by changing the firing input given to the 4 SCR*

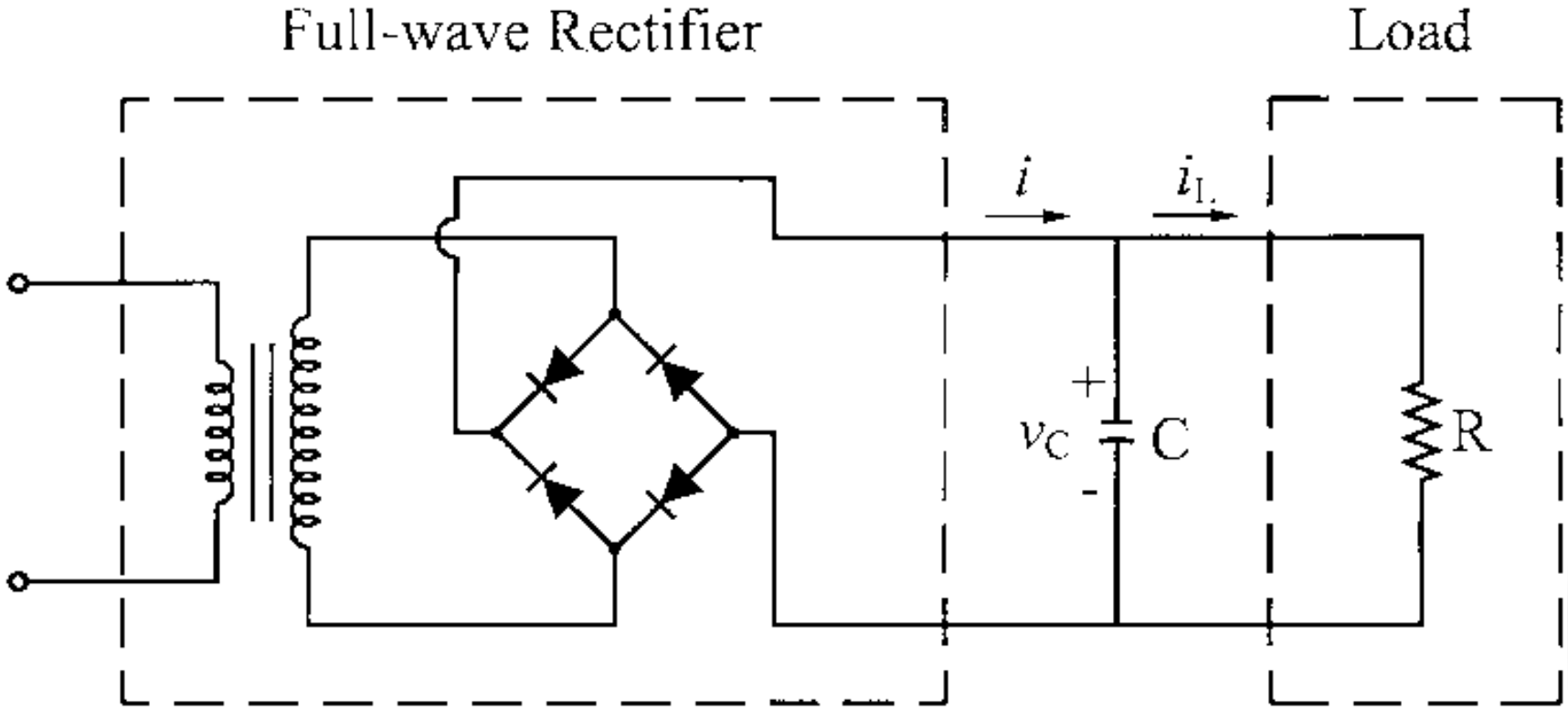
Speed of the DC Series Motor can be vary by the changing the firing angle given to the SCR

Speed control of DC Motor (Series) by Three phase RECTIFIER



ASSESSMENT

Find the Input & output of the following Circuit.



References

1. https://www.sakthistabilizer.in/phase-converter.html
2. https://en.wikipedia.org/wiki/Phase_converter
3. https://www.youtube.com/watch?v=3-9YBY9Xzfs

Thank You!!!