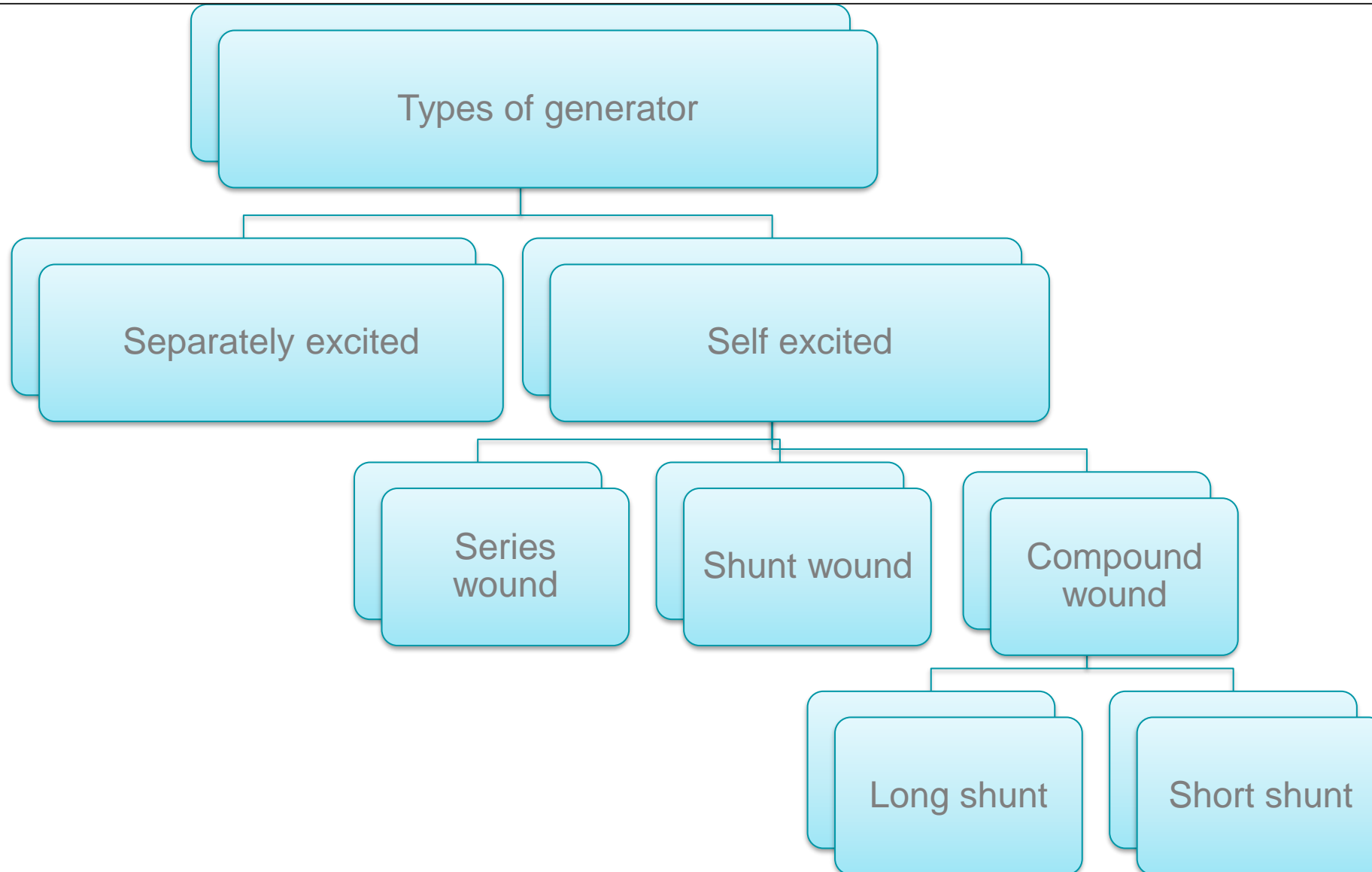


DC GENERATOR

Part 2 - Note

Types of Generator



Separately Excited

- Field magnets are energized by some external DC source

$$E_g = V + I_a R_a + 2V_b$$

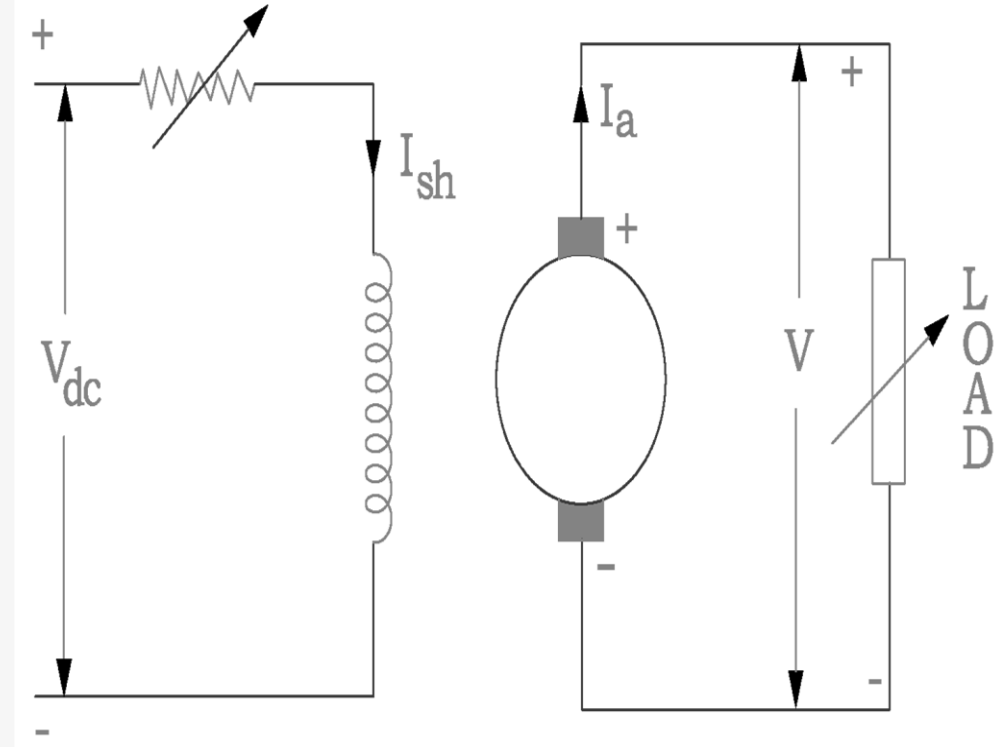
E_g = Generated voltage at armature

V = Terminal voltage

I_a = Armature current

R_a = Armature resistance

V_b = brush drop



$$P_{\text{generated}} = E_g I_a$$
$$P_{\text{output}} = V I_L$$

Series Wound Generator

- Field coil connected series with armature winding
- Winding consist of thick wire of a few turns
- Normally resistance less than one ohm.

$$E_g = V + I_a (R_a + R_{se}) + 2V_b$$

E_g = Generated voltage at armature

V = Terminal voltage

I_a = Armature current

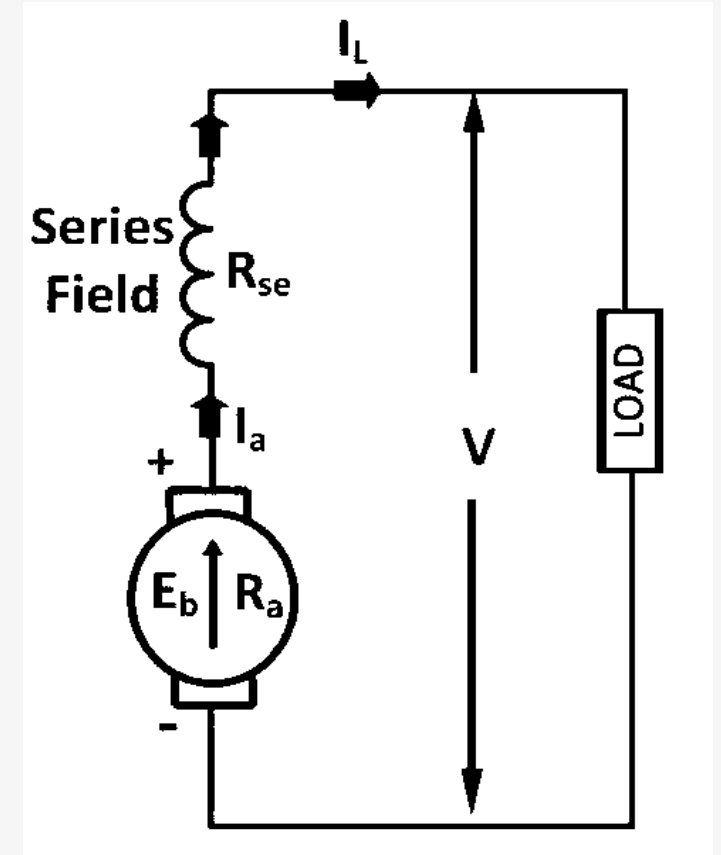
I_{se} = Series field current

$$I_a = I_{se} = I_L$$

R_a = Armature resistance

R_{se} = Series field resistance

V_b = brush drop



$$P_{\text{generated}} = E_g I_a$$

$$P_{\text{output}} = V I_L$$

Shunt Wound Generator

- Field winding connected across the armature
- Full voltage applied across it
- Winding consist of thin wire of a many turns
- Resistance of the order of 100 ohm.

$$E_g = V + I_a R_a + 2V_b$$

E_g = Generated voltage at armature

V = Terminal voltage

I_a = Armature current

I_{sh} = Shunt field current

I_L = Load current

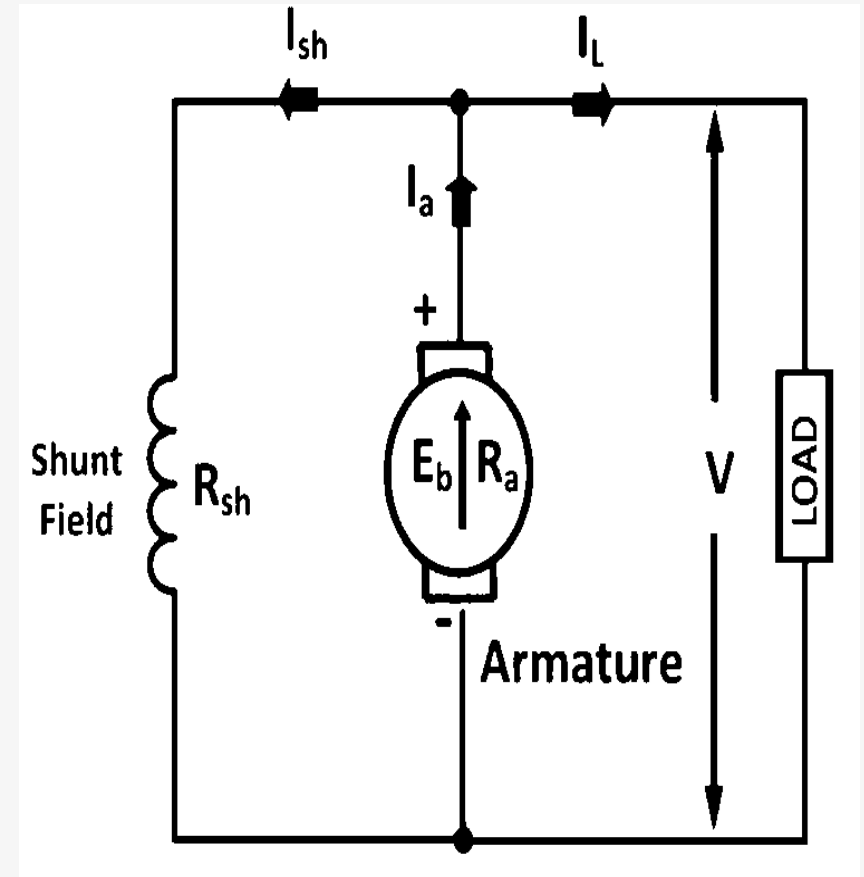
$$I_a = I_L + I_{sh}$$

R_a = Armature resistance

R_{sh} = Shunt field resistance

V_b = brush drop

$$R_{sh} = \frac{V}{I_{sh}}$$



$$P_{\text{generated}} = E_g I_a$$

$$P_{\text{output}} = V I_L$$