REGULATORS

Voltage Regulators :

Voltage regulator is an electronic circuit that provides constant D.C. voltage independent of load current, a.c. (line voltage variations and temperature.

There are two type of regulators

1. line regulation
2. load regulation

Line Regulation:

The line regulation is defined as change in output voltage for a change in line supply by keeping load current and temperature constant

$$Lind\ \ regulation = \frac{change\ in\ output\ voltage}{change\ in\ input\ voltage}$$
$$= \frac{\Delta V_0}{\Delta V_{in}}$$

Load Regulation :

Load regulation is defined as change in output voltage for a change in load current by keeping line voltage and temperature constant.

$$Load\ \ regulation = \frac{change\ in\ output\ voltage}{change\ in\ load\ \ current}$$
$$= \frac{V_{NL} - V_{FL}}{V_{NL}}$$

V_{NL} – *d.c. output voltage for no load condition*

V_{FL} – *d.c. output voltage for full load condition*

$$\%\ regulation = \frac{V_{NL} - V_{FL}}{V_{NL}} \times 100$$

Simple circuit of Zener diode regulator :

$$I_i = I_Z + R_L$$
$$V_i = V_Z + I_i R$$
$$But \quad I_i = I_L + I_z$$
$$V_i = (I_L + I_z)R + V_z$$

Transistor is also used as regulator. There are two types

1. Transistor series regulator
2. Transistor shunt regulator