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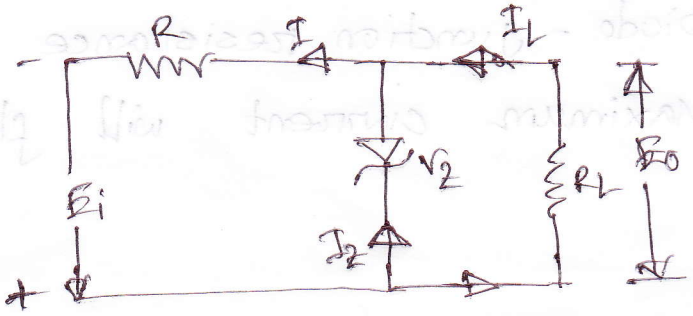
Ideal diode: An ideal diode is one which acts as a perfect conductor when forward biased and as a infinite resistor when reverse biased.

Zener diode: A properly doped crystal diode which has a sharp breakdown voltage is known as a zener diode.

It acts as a battery, voltage regulator, peak clipper, refresher of waveform.

Zener diode as a voltage regulator:

A zener diode can be used as a voltage regulator to provide a constant voltage from the source whose voltage may vary over sufficient range. The zener diode of zener voltage V_Z is reverse connected across the load resistor (R_L), which constant output is required. The series resistance absorbs the output voltage across the load resistor. It may be noted that, the zener will maintain a constant voltage V_Z (E_0) across the R_L so long as the input voltage does not fall below V_Z.



From the figure,

voltage drop across $V = E_i - E_o$

current through, $I = I_z + I_L$

Applying ohm's Law, we have,

$$R_p = \frac{V}{I}$$

$$= \frac{E_i - E_o}{I_z + I_L}$$

Effect of biasing on p-n junction diode:

1. No-bias:

1. Minority carriers will pass quickly to p-type material from depletion region.
2. Minority carriers from n-type material will pass directly to p-type material.
3. Net flow of charge in one direction is zero.

2. Forward Bias:

1. Electrons and holes move towards the junctio
2. Depletion layer will be reduced.
3. Diode - junction resistance will be reduced.
4. Maximum current will flow.

3. Reverse bias:

1. Electrons and holes move outward from the junction.
2. Depletion layer will be wider.
3. Diode - junction resistance will be very high.
4. Maximum current due to minority carrier will flow.

Avalance breakdown: Avalance breakdown is a form of electric current multiplication that allow very large currents to flow within material which are otherw good insulator.

Zener breakdown: In reverse-bias region the diode current is the very small reverse saturation current until a level is reached and current will flow in the opposite direction. the level of multiplicative current is called zener breakdown.