

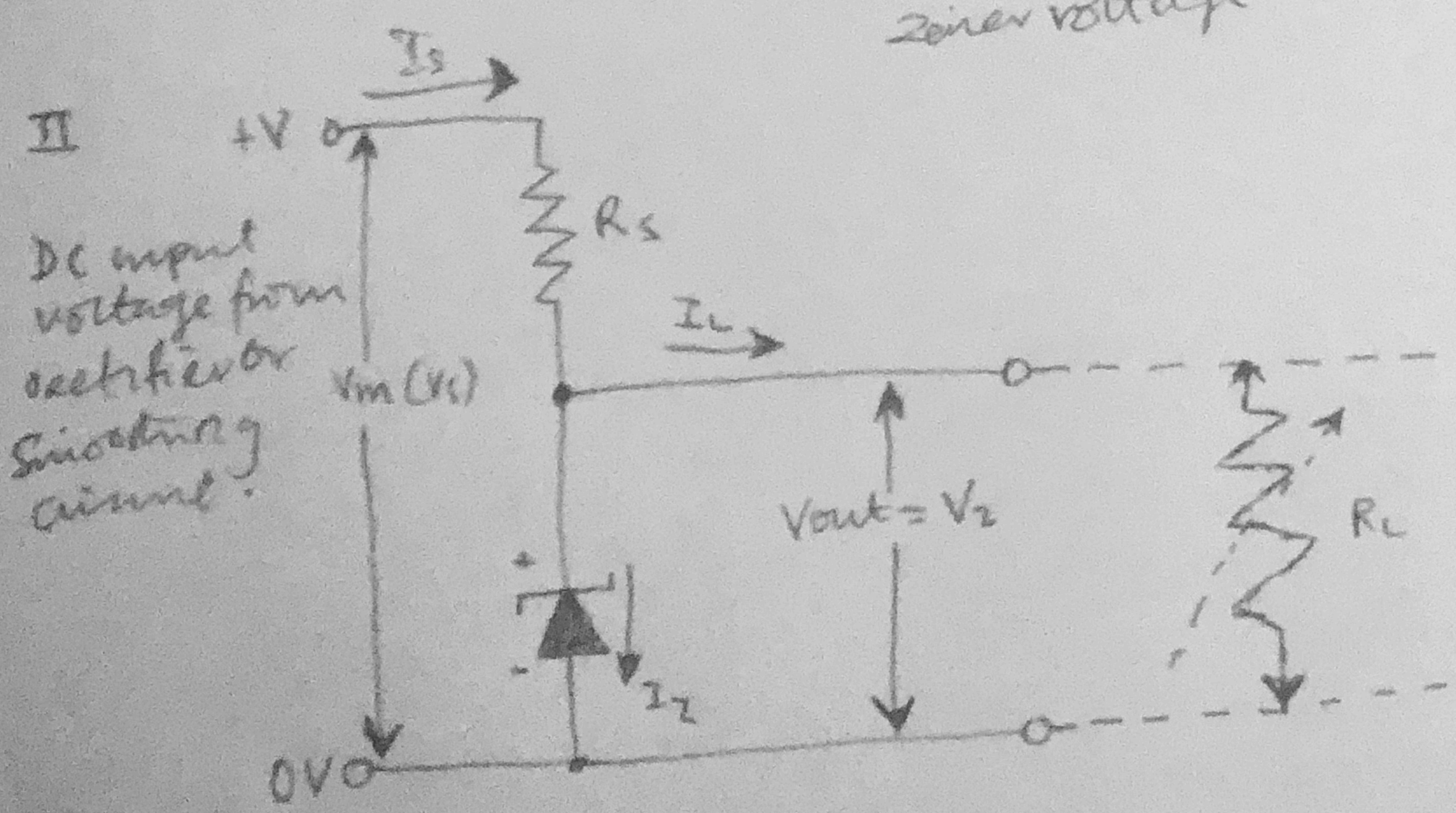
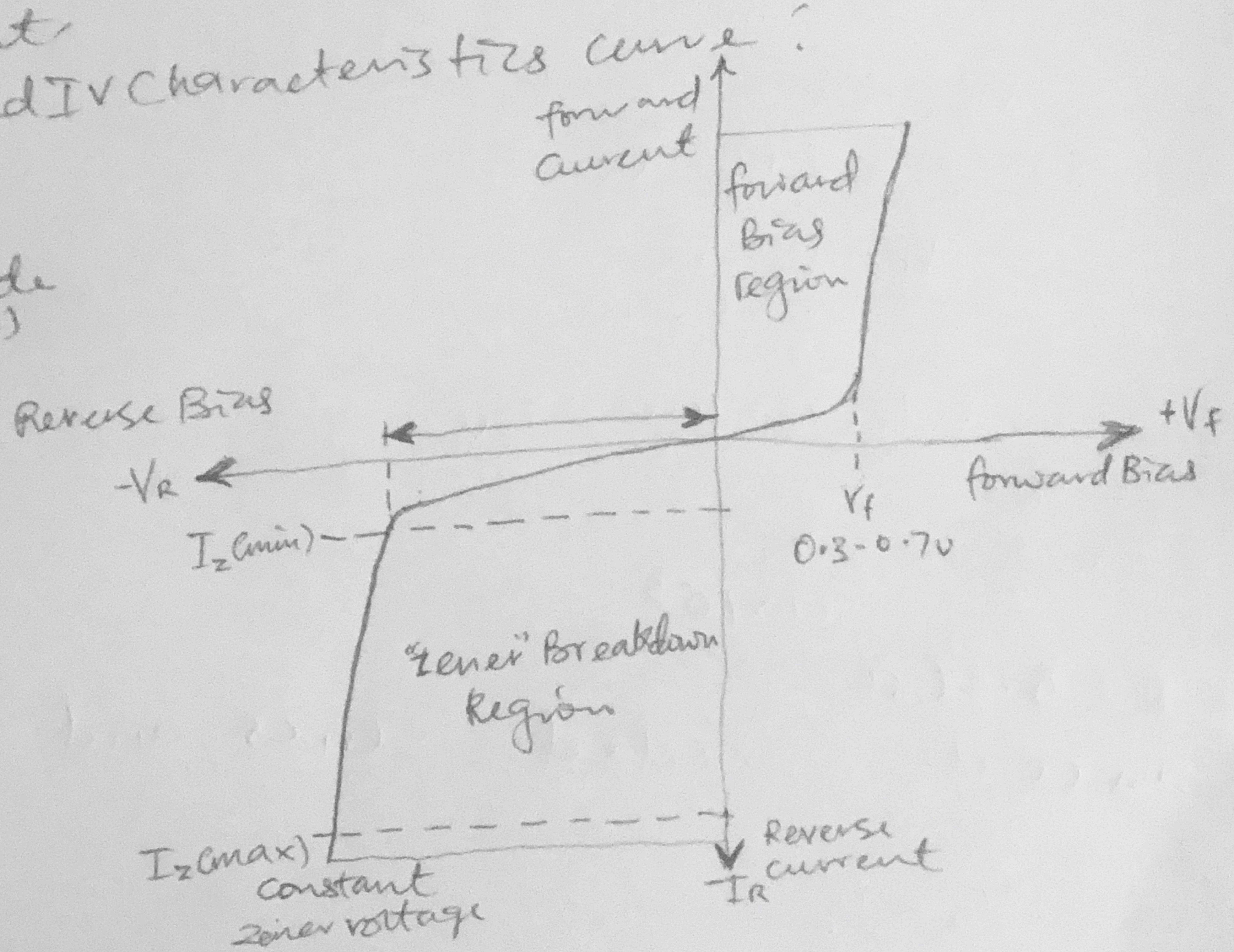
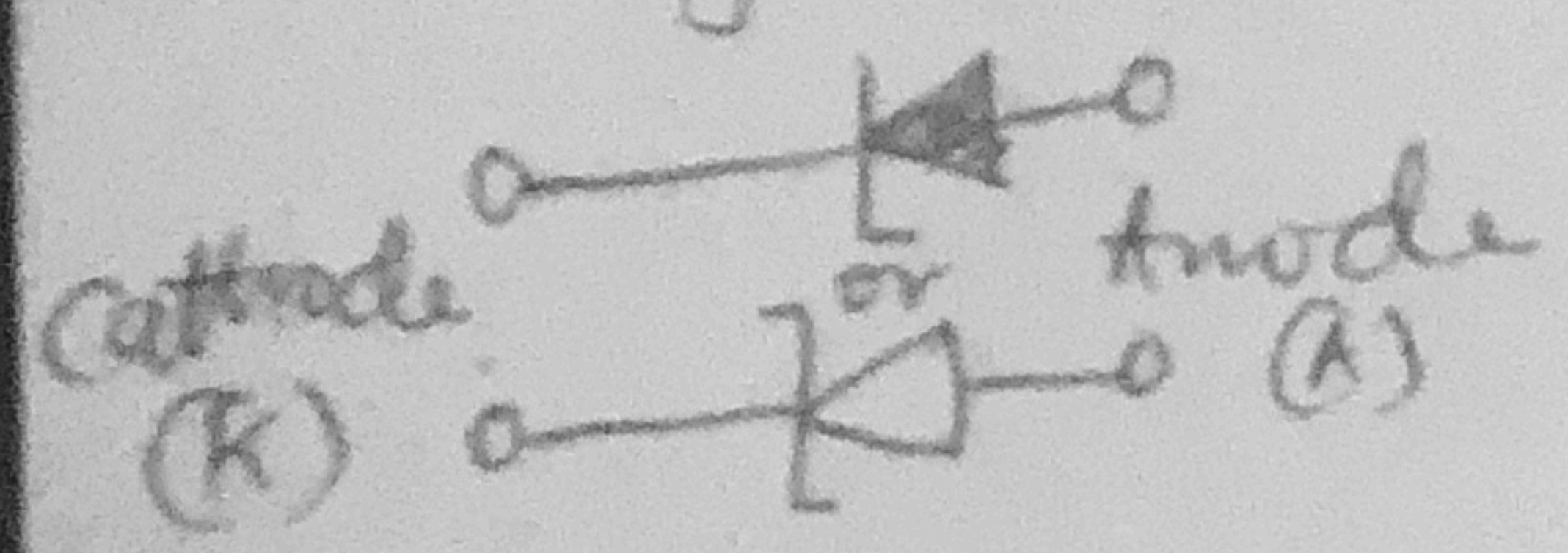
# CHIDI MILESTONE MIRACLE

18/eng01/005

## Chemical Engineering Basic Elect Assignment

1) A zener diode is always operated in its reverse biased condition. As such a simple voltage regulator circuit can be designed using a zener diode to maintain a constant D.C output voltage across the load in spite of variations in the input voltage or changes in the load current.

2) Symbol and IV Characteristics curve:



(2)

$$P_2 = 5W$$

$$I_2 = 500mA$$

$$20V_{max}$$

To convert  $V_{max}$  to  $V_{dc}$

$$V_{dc} = \frac{2V_{max}}{\pi}$$

$$V_s = \frac{2 \times 20}{\pi} = 12.73V_{dc}$$

recall that  $P = IV$

$$V_2 = \frac{P_2}{I_2} = \frac{5}{500 \times 10^{-3}}$$

$$V_2 = 10V$$

Recall that  $V_2 + V_R = V_s$

$$V_R = V_s - V_2$$
$$= \frac{2 \times 20}{\pi} - 10$$

$$= 12.73 - 10 = 2.73V$$

$$V = IR$$

$$R = \frac{V}{I} = \frac{2.73}{500 \times 10^{-3}}$$

$$R = 5.46\Omega$$

B) Since it's connected in series, and same current flows.

$$I_s = I_2 + I_L$$

$$I_2 = I_s - I_L$$

$$I_L = \frac{V_2}{R} = \frac{10V}{500\Omega}$$

$$= 0.02A \approx 20mA$$

$$I_2 = 500mA - 20mA$$

$$= 480mA \approx \underline{\underline{0.48A}}$$