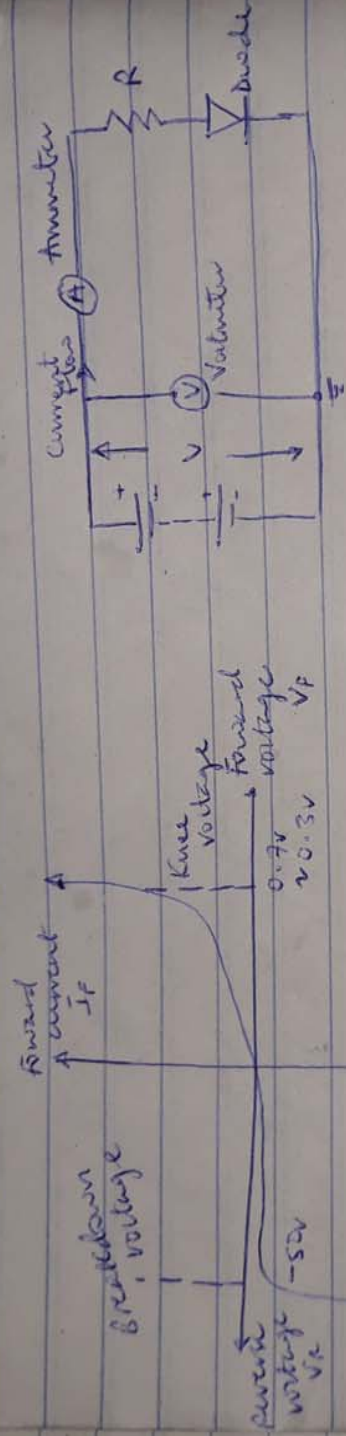


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1. A Zener diode is always operated in its reverse biased condition. As such a simple voltage regulator circuit can be designed using a Zener diode to maintain a constant DC output voltage across the load in spite of variations in the input voltage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



Circuit diagram

I-V characteristics curve

$$2i \quad R_3 = \frac{V_3 - V_Z}{I_Z} = \frac{20 - 10}{0.5} = 20 \Omega$$

$$V_3 = \frac{\text{Watts}}{\text{Max current}} = \frac{5}{0.5} = 10V$$

$$ii \quad I_L = \frac{V_Z}{R_L} = \frac{10}{500} = 0.02A = 20mA$$