

Ubari - Wakoma Blossom Chingor

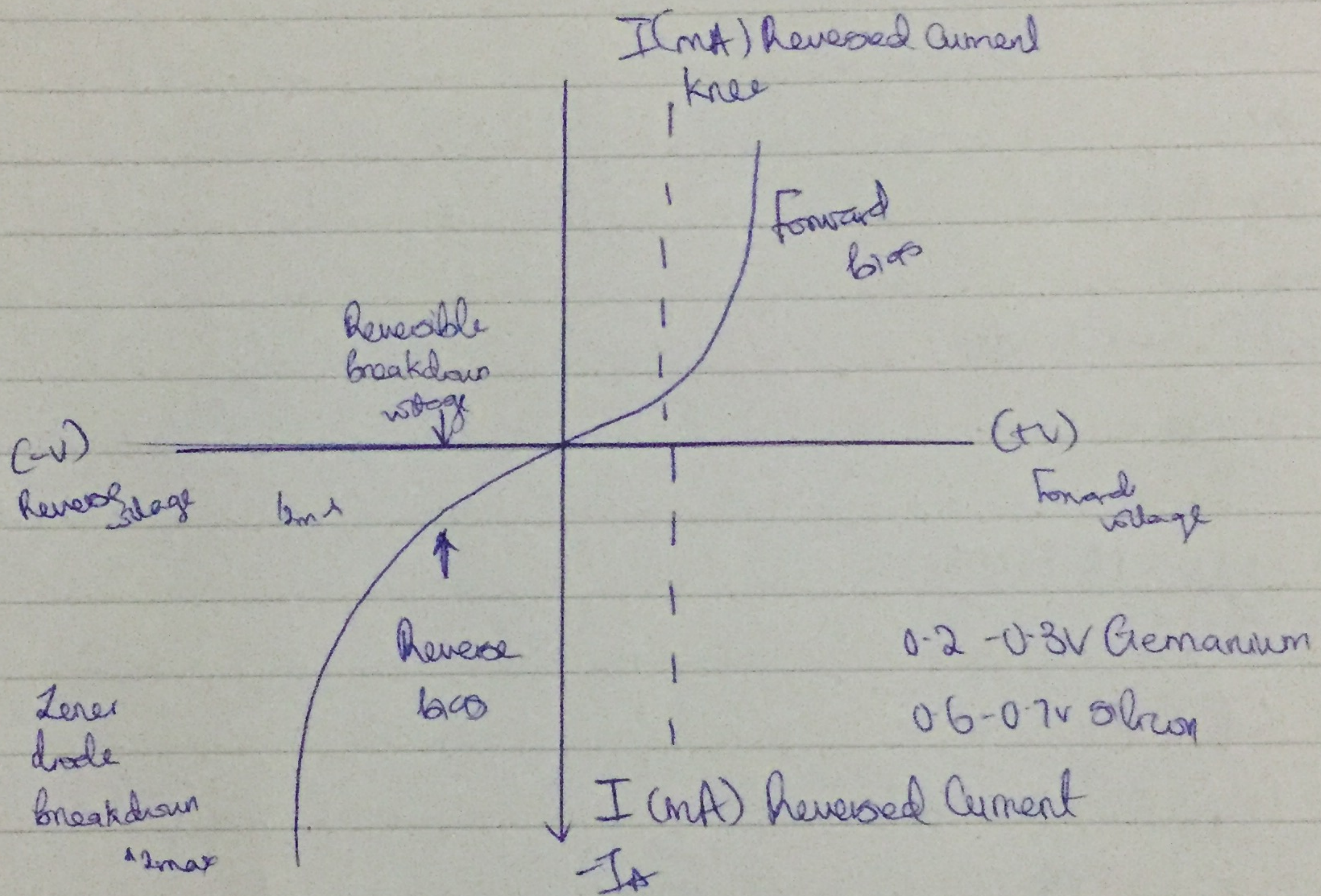
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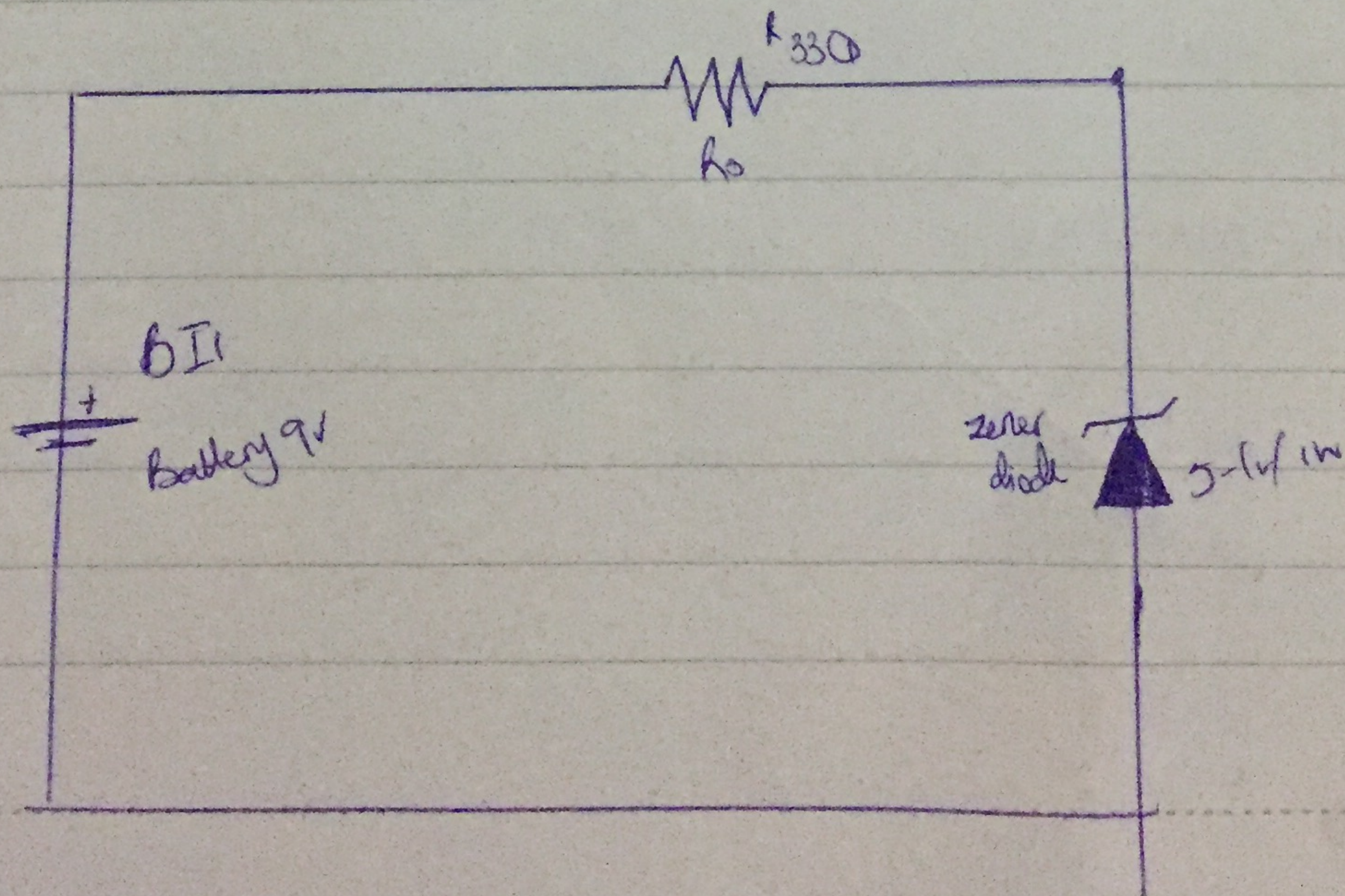
Elect/Elect

Eng 222

A Zener diode voltage regulator consists of a current limiting resistor  $R_s$  connected in series with the input voltage  $V_s$  with the zener diode  $R_z$  in this reversed biased condition. The stabilized output voltage is always selected to be the same as the breakdown voltage of the diode.



I-V Characteristics Curve



Uban-Wakoma Blossom Chuzor / 18 (ENG 071071)

4) Branches connected in series, and same current flows

$$I_3 = I_2 + I_1$$

$$I_2 = I_3 - I_1$$

$$I_1 = \frac{V_2}{R}$$

$$= \frac{10V}{500\Omega} = 0.02A = 20mA$$

$$I_2 = 500mA - 20mA$$

$$= 480mA = 0.48A$$

$$P_2 = 5W$$

$$I_2 = 500mA$$

2W max

To convert  $V_{max}$  to VDC

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

$$V_3 = \frac{2 \times 20}{\pi} = 12.73V_{DC}$$

Recall that  $P = IV$

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

Recall that  $V_2 + V_R = V_3$

$$V_R = V_3 - V_2$$

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

$$= 12.73 - 10 = 2.73V$$

$$\therefore V = 1A$$

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

$$R = 5.46$$