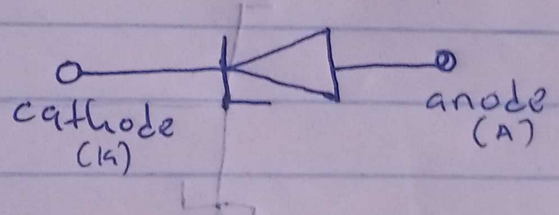
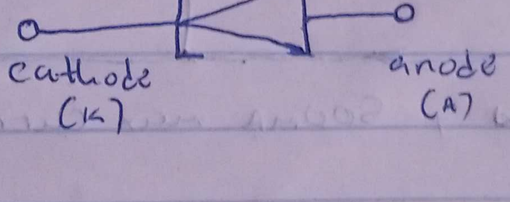
CHIMA WISDOM EMMICHE
18/ENG04/025
Electrical / Electronics
ENG222

① the zener diode is specially made to have a reverse voltage breakdown at a specific voltage. It's characteristics are otherwise very similar to common signal diodes. In breakdown the voltage across the zener diode is close to constant over a wide range of currents thus making it useful as a shunt voltage regulator.

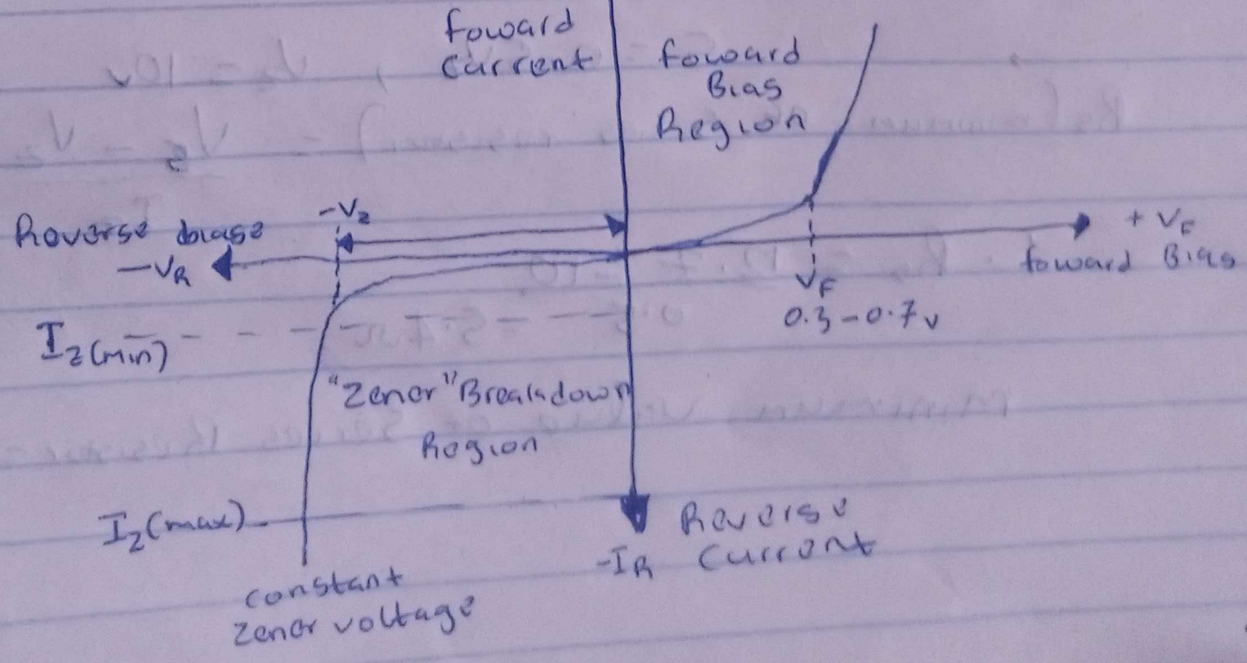
1: Symbol



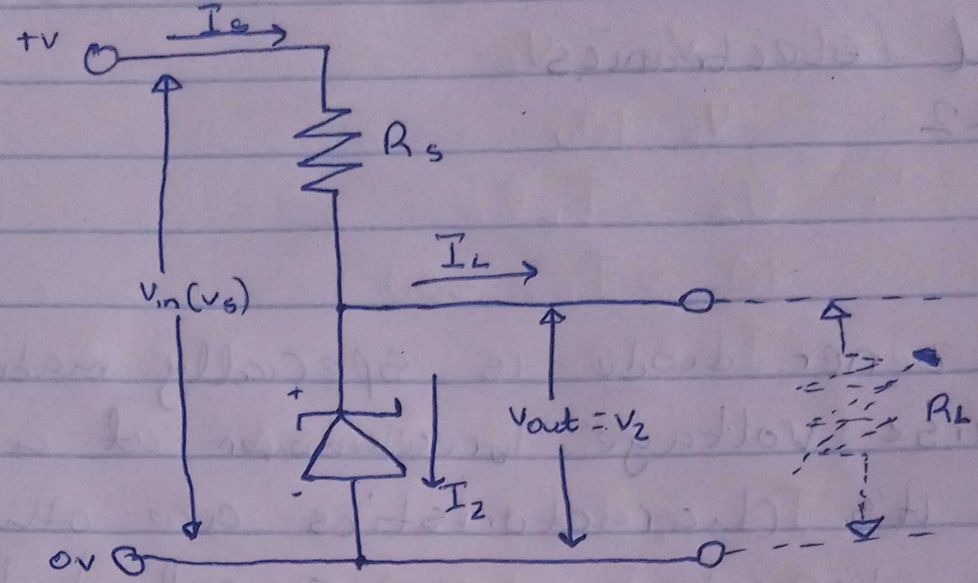
OR



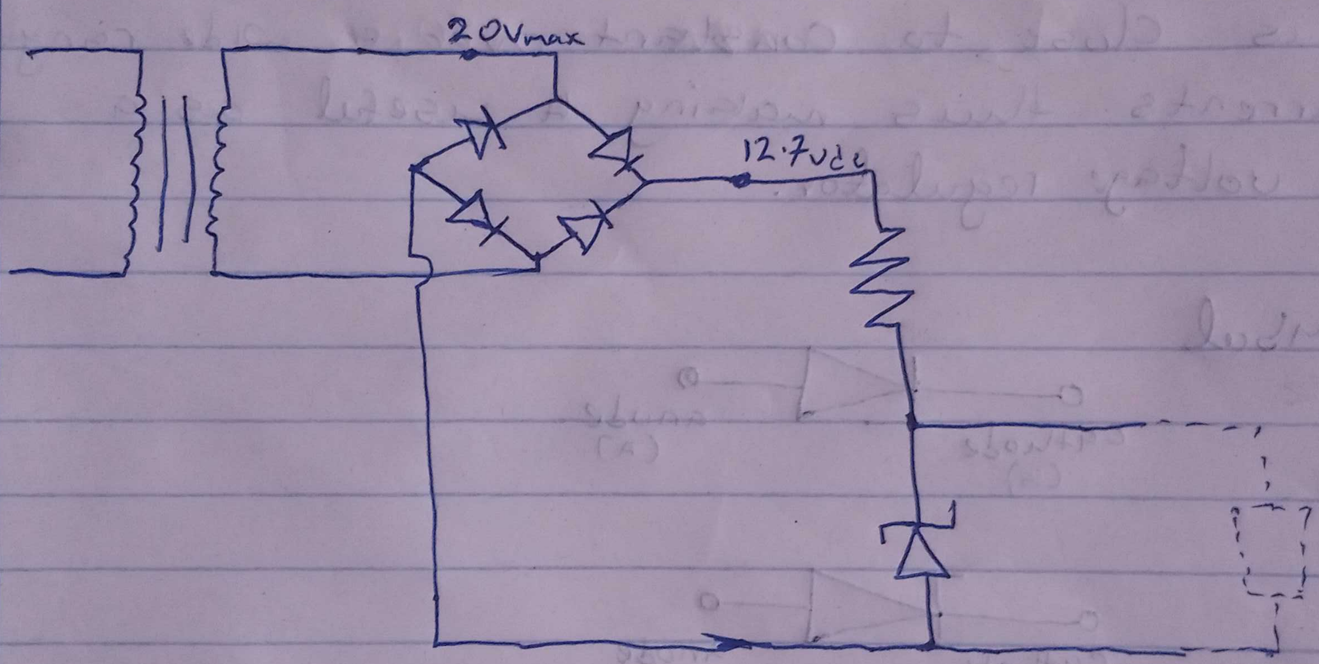
I-V Characteristics Curve



ii) Circuit diagram



(2)



Zenner rating: 5w, 500mA max current = 0.5A

(1) $I_{max_Z} = \frac{P}{V_Z \text{ or } V_L} = 0.5 = \frac{5}{V_Z}$

$5 = 0.5 V_Z$, $V_Z = 10V$

R_S (minimum of series resistor) $= \frac{V_S - V_Z}{I_Z}$

$\therefore R_S = \frac{12.7 - 10}{0.5} = 5.4\Omega$

Minimum value of series Resistor = 5.4Ω

(11) Current across the diode at full load of 500Ω

Since $V_Z = V_L$

$V_L = 10V$

$\therefore V_L = I_L R_L$

$10 = I_L \times 500$

$I_L = \frac{10}{500} = 0.02A$

$I_S = I_Z + I_L$

$0.5 = I_Z + 0.02$

$I_Z = 0.5 - 0.02$

$I_Z = 0.48A = 480mA$