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18/ENG03/001
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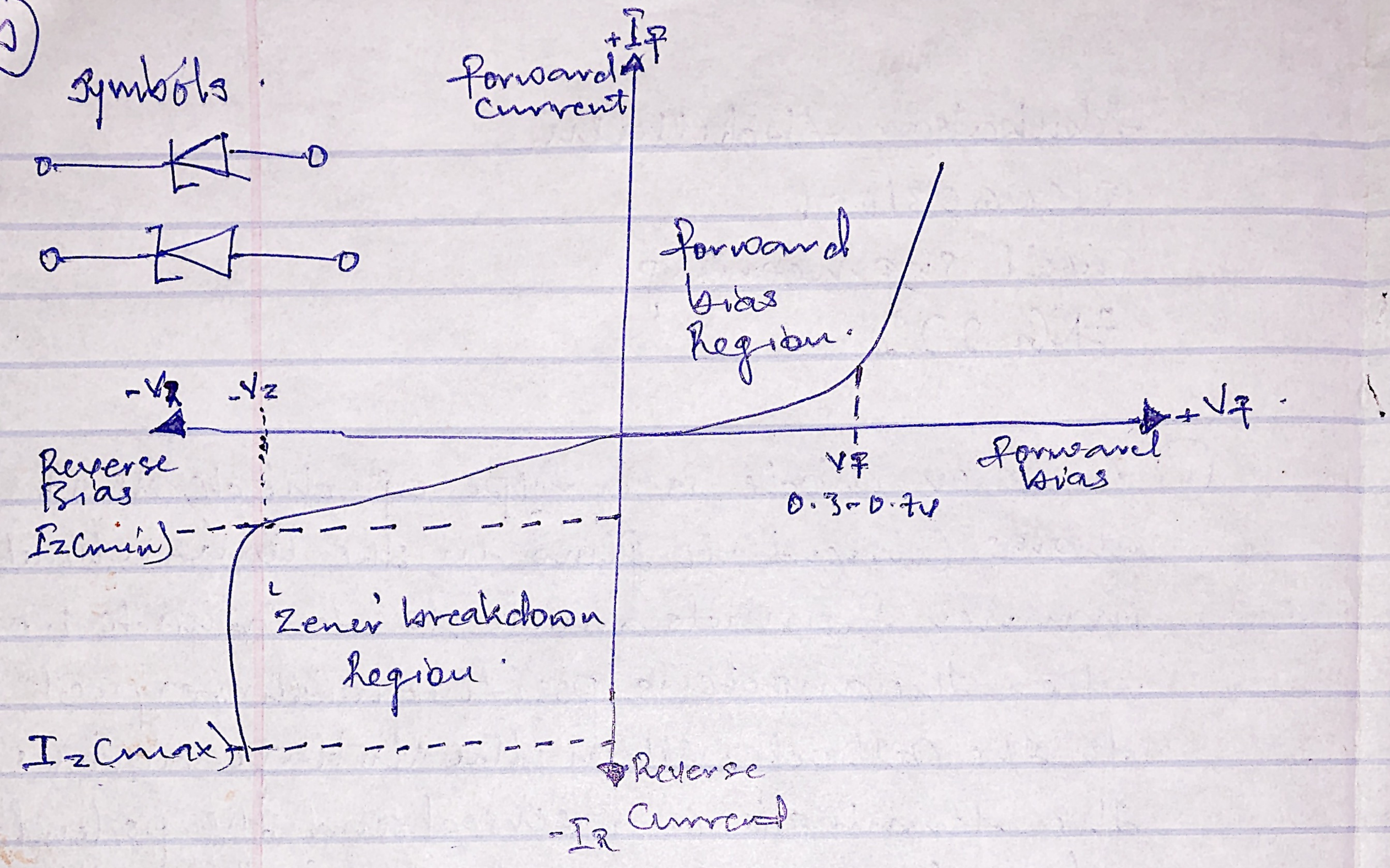
ENG 222

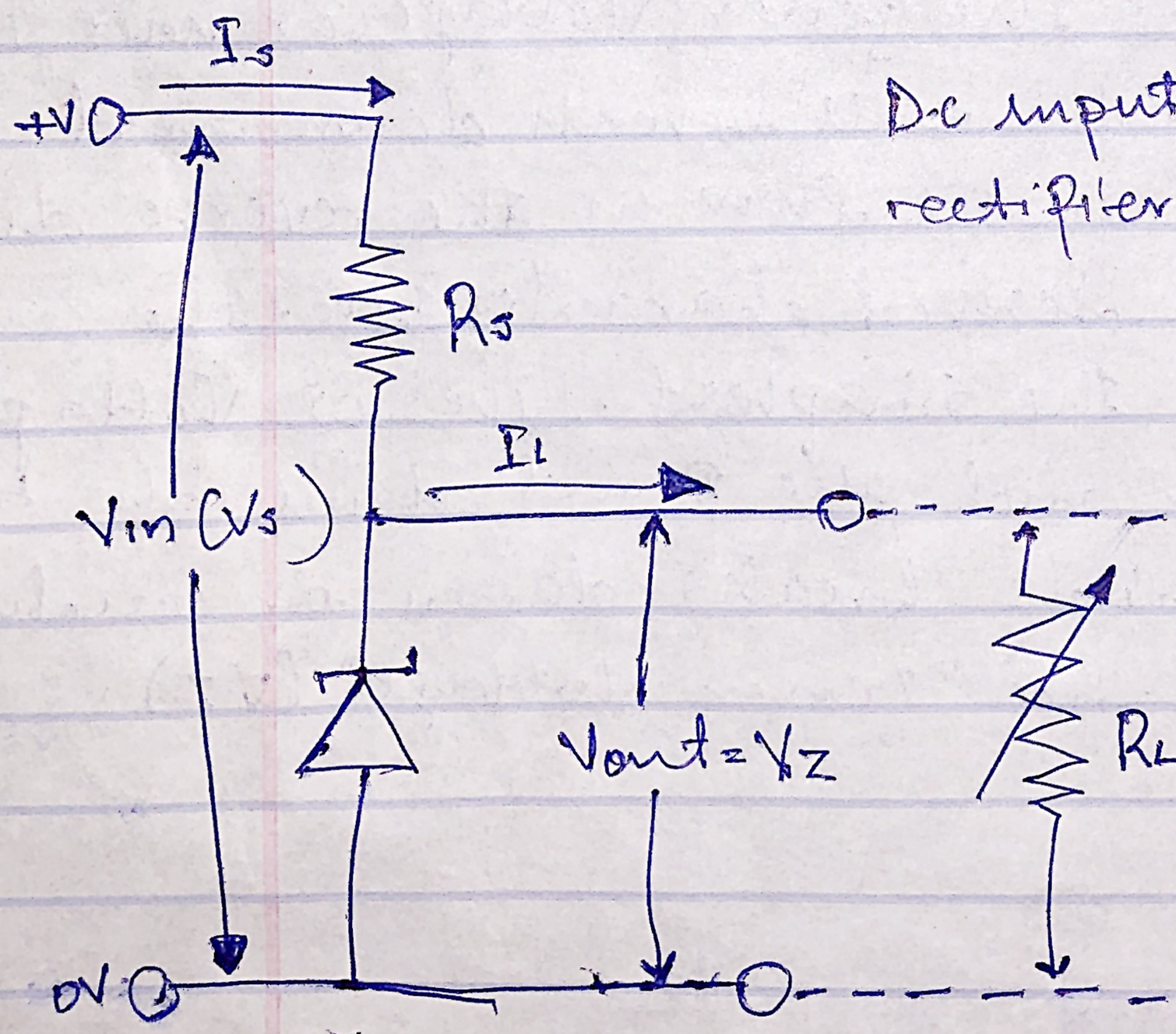
(1) A zener diode is a type of diode that allows current to flow in the conventional manner from its anode to its cathode i.e when the anode is positive with respect to the cathode. When the voltage across the terminals is reversed and the potential reaches the zener voltage (or "knee"). The junction will breakdown and current will flow in the reverse direction - a desired characteristic. The zener diode is the simplest types of voltage regulator and the point at which a zener diode breaks down or conducts is called the "zener voltage" (Vz).

b)

Symbols



c)



D.c input voltage from rectifier or Smoothing Circuit

(2) max power = 5W $I_2 = 500mA = 0.5A$, $20V_m = V_s$

(i) maximum Current = $\frac{\text{max power}}{\text{Voltage}} = \frac{5W}{V} = 0.5A$

$V_2 = 10$ volts.

minimum resistance = $\frac{V_s - V_2}{I_2}$

$V_{dc} = 0.637 V_{max}$

$= 0.637 \times 20$

$= 12.74 V_{dc}$

minimum resistance = $\frac{12.74 - 10}{0.5} = 5.48\ \Omega$

(ii) load Current $I_L = \frac{V_2}{R_L} = \frac{10}{500} = 0.02A$ or ~~20mA~~ 20mA

$I_2 = I_s - I_L$

$= 500 - 20$

$= 480mA$