18/ENG06/057
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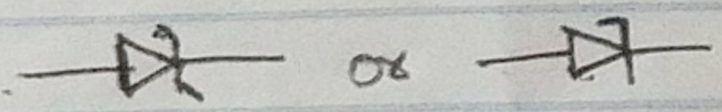
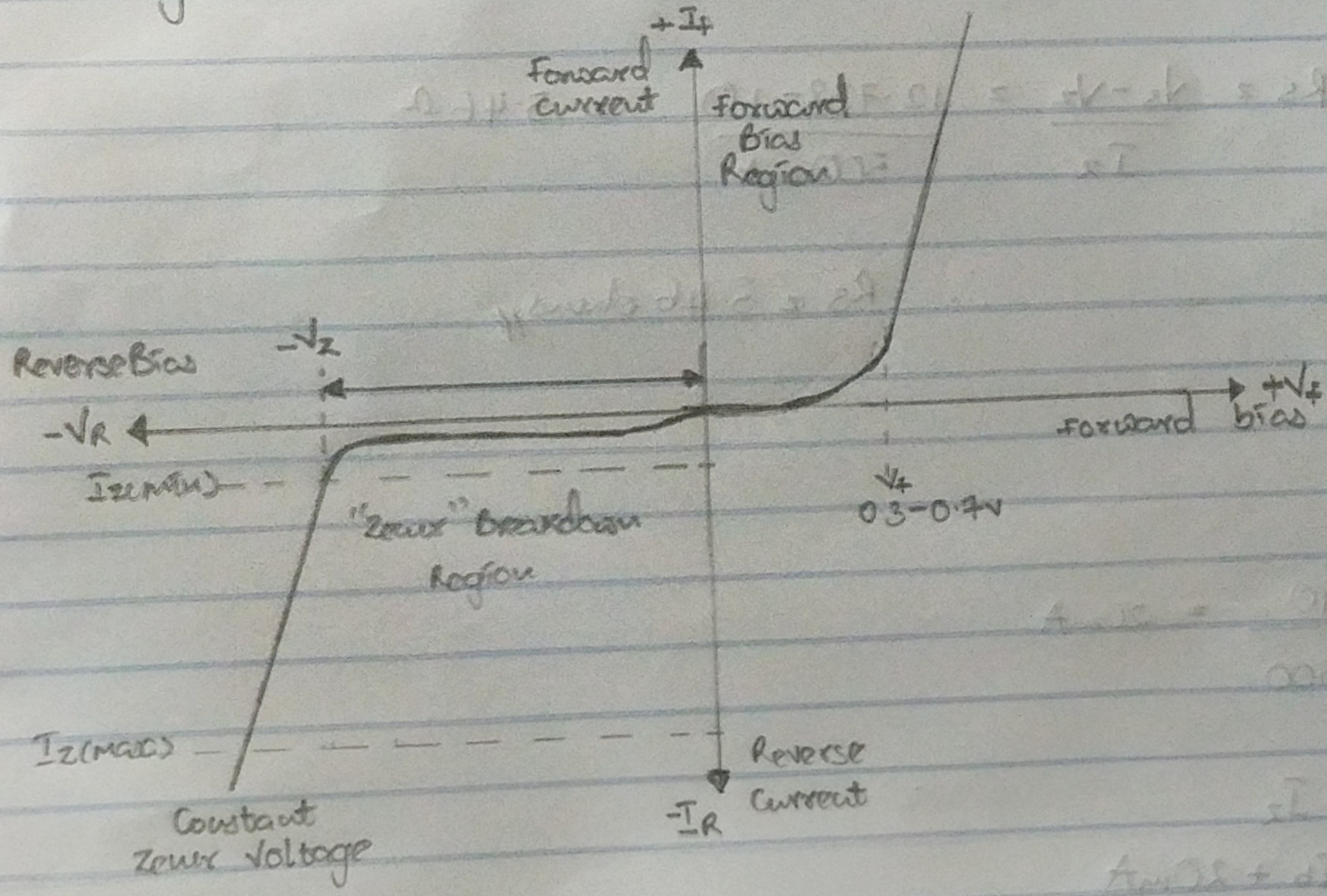
Mechanical Engineering
ENG222

1) A zener diode commonly called "Breakdown Diode" is described as a general purposed signal diode consisting of a silicon P-N junction They have low pre-determined Reverse Breakdown Voltage ~~which~~ ~~also makes~~ it is mostly used in it's reversed bias mode.

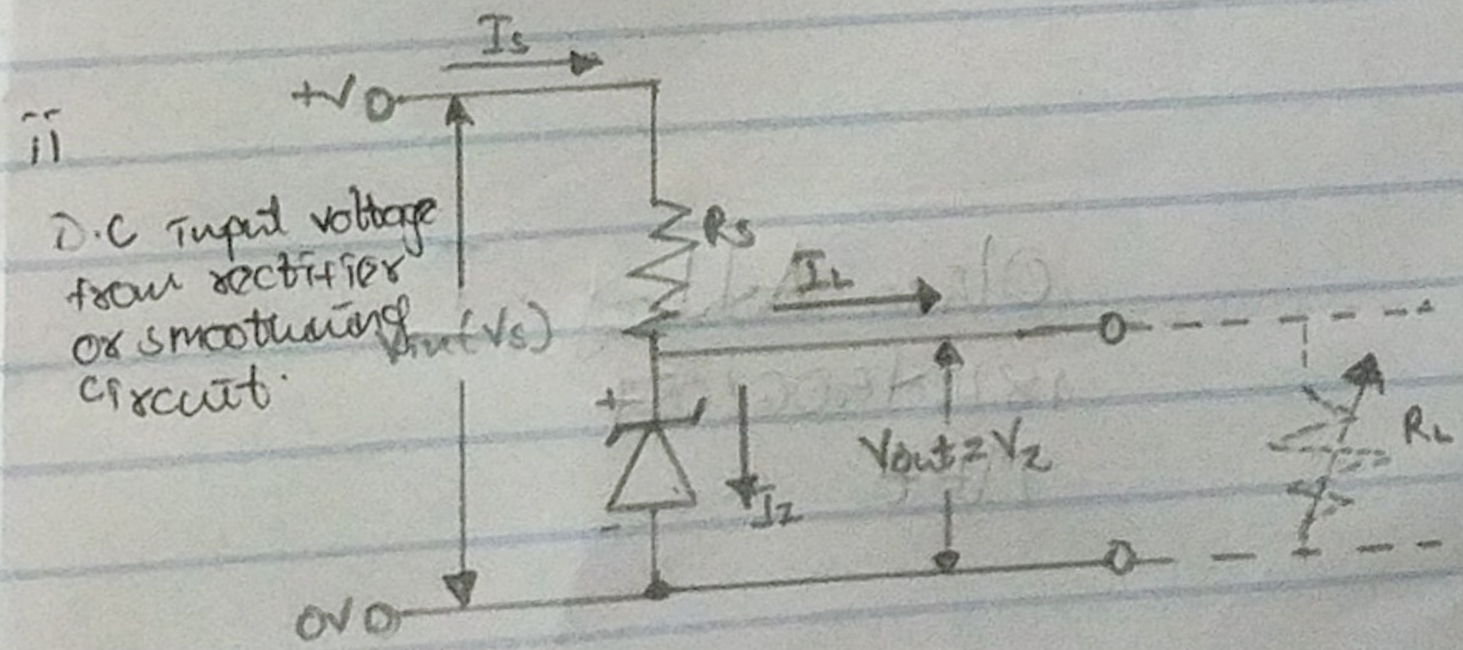
i)  or

symbol (circuit)



I-V characteristics

ii)



Circuit Diagram

2) i minimum value current = 500mA power = 5W

$V_z = 10V$, $V_{max} = 20V$

max current = $\frac{\text{watts}}{\text{voltage}}$

$500mA = \frac{5}{V}$

$\text{voltage} = \frac{5}{500 \times 10^{-3}} = 10V$

$V_{dc} = \frac{2V_{max}}{\pi} = \frac{2 \times 20}{\pi} = 12.732V$

using $R_s = \frac{V_s - V_z}{I_z} = \frac{12.732 - 10}{500mA} = 5.46\Omega$

$\therefore R_s = 5.46 \text{ ohms}$ //

ii $V = IR$

$I = \frac{V}{R} = \frac{10}{500} = 20mA$

$I_a = I_b + I_z$

$500mA = I_b + 20mA$

$I_b = 500mA - 20mA$

$= 480mA$ //

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