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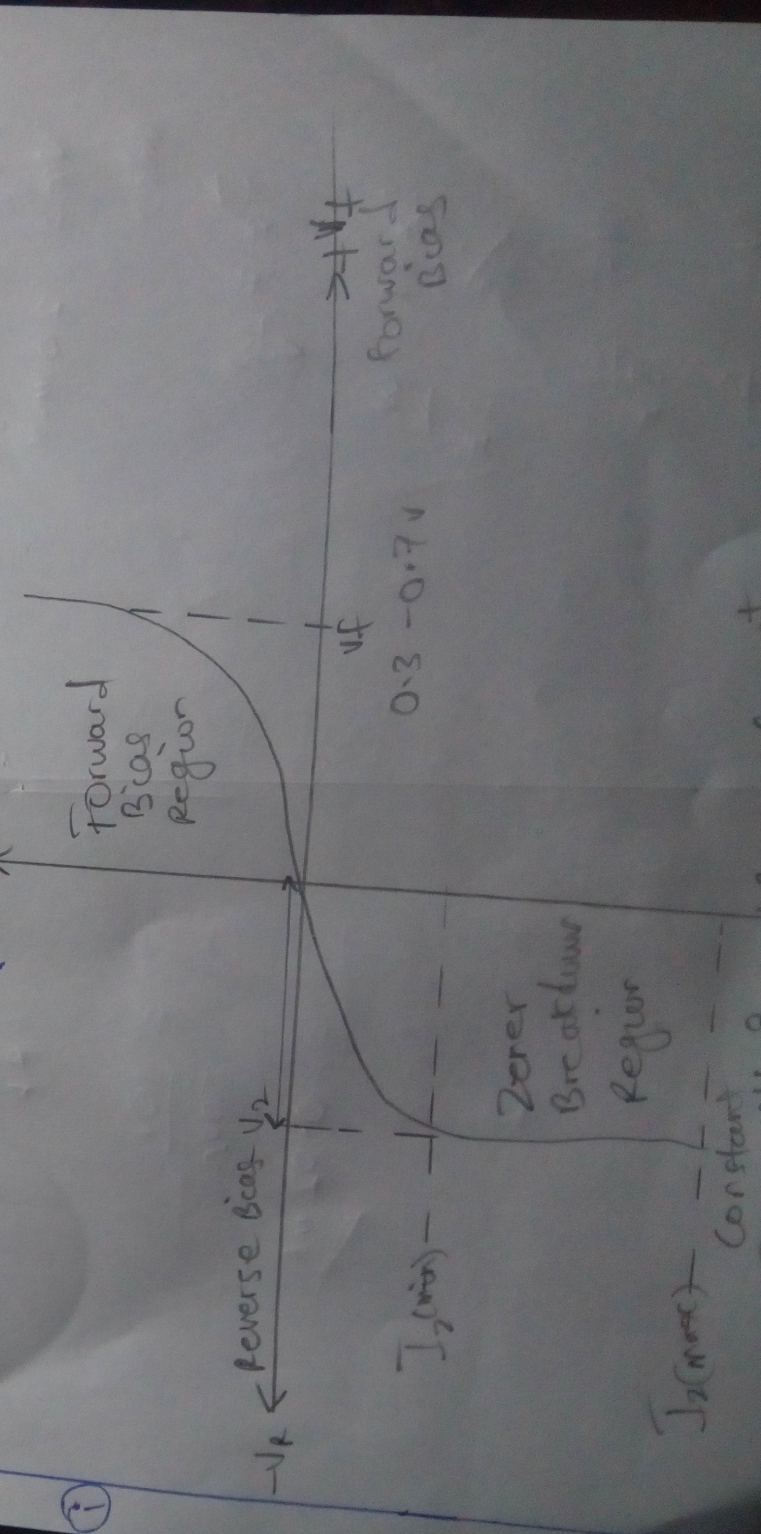
COURSE TITLE: Basic Electrical Engineering II

COURSE CODE: ENG 222

DEPT: Computer Engineering

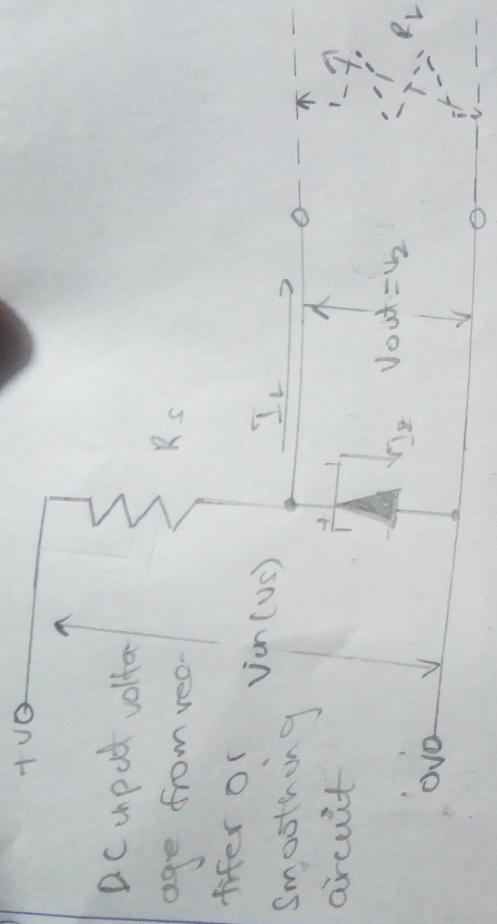
① A zener diode regulator is the simplest type of voltage regulator and the point at which a zener diode breaks down or conducts is called the "zener voltage" ( $V_Z$ ). The zener diode is like a general-purpose signal diode consisting of a silicon PN junction. When biased in the forward direction it behaves just like a normal signal diode passing the rated current, but as soon as a reverse voltage applied across the zener diode exceeds the rated voltage of the device, the diode breakdown voltage is reached at which a process called Avalanche.

Breakdown occurs in the semi-conductor depletion layer and a current starts to flow through the diode to limit their increase in voltage.



①

ii)



DC input voltage from rectifier or smoothing circuit

### ZENER DIODE REGULATOR

② ① Minimum value of series resistor to the zener diode

$$R_s = \frac{V_s - V_z}{I_z}$$

$$P = 5W$$

$$I_z = 500mA = 0.5A$$

$$V_z = 20V$$

$$V_{dc} =$$

$$I_z = \frac{V}{V}$$

$$\frac{I_z V}{I_z} = \frac{V}{I_z}$$

$$V = \frac{3}{I_z}$$

$$V = \frac{3}{0.5}$$

$$R_s = \frac{20 - 10}{0.5}$$

$$R_s = 20\Omega$$

② The current across the diode at full load of 500mA

$$I_L = \frac{V_z}{R_L}$$

$$= \frac{10V}{500\Omega}$$

$$= 0.02mA$$