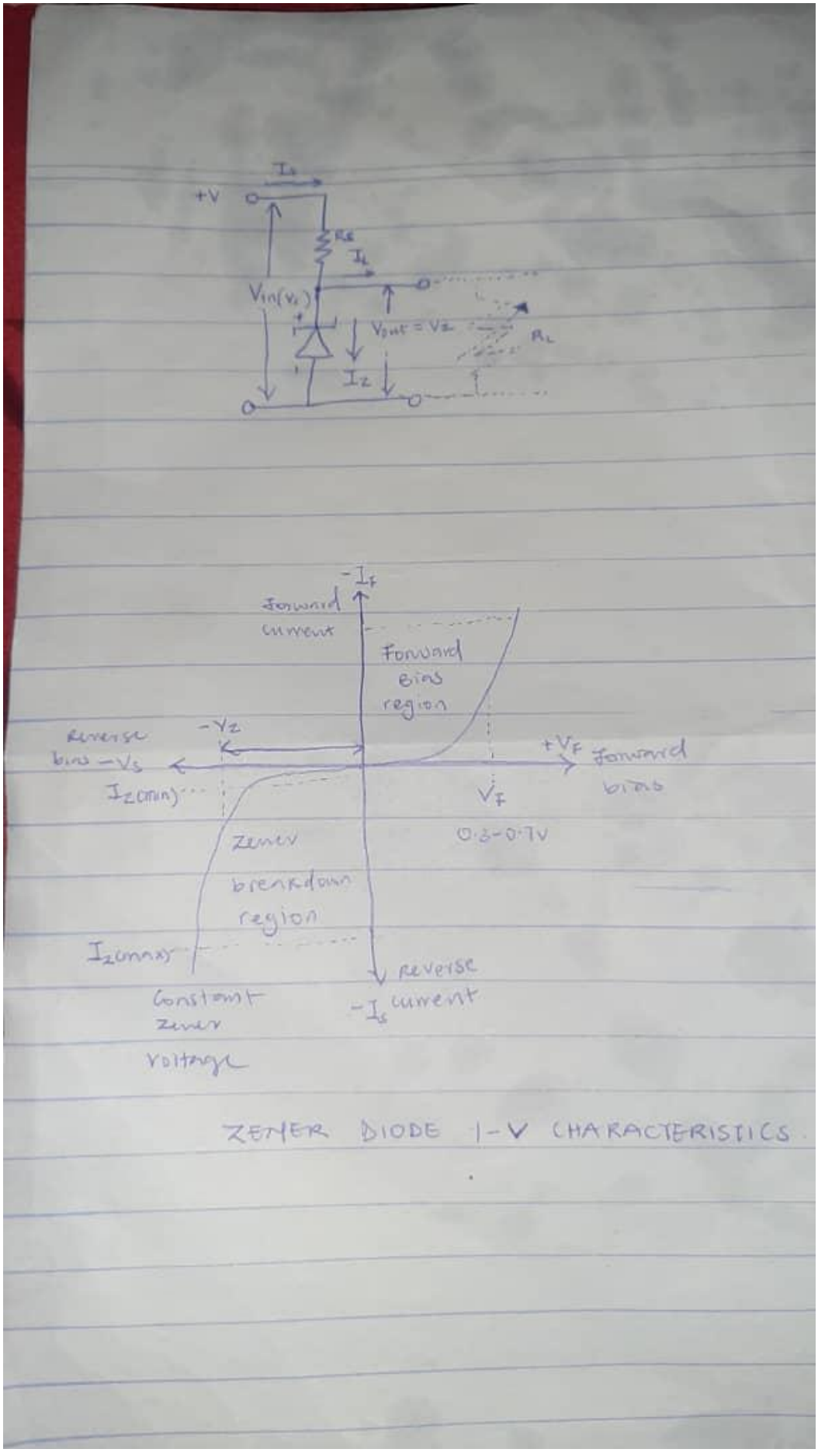
NAME: UZO-NWOSU ADAEZE
MECHATRONICS ENGINEERING 18/ENG05/065



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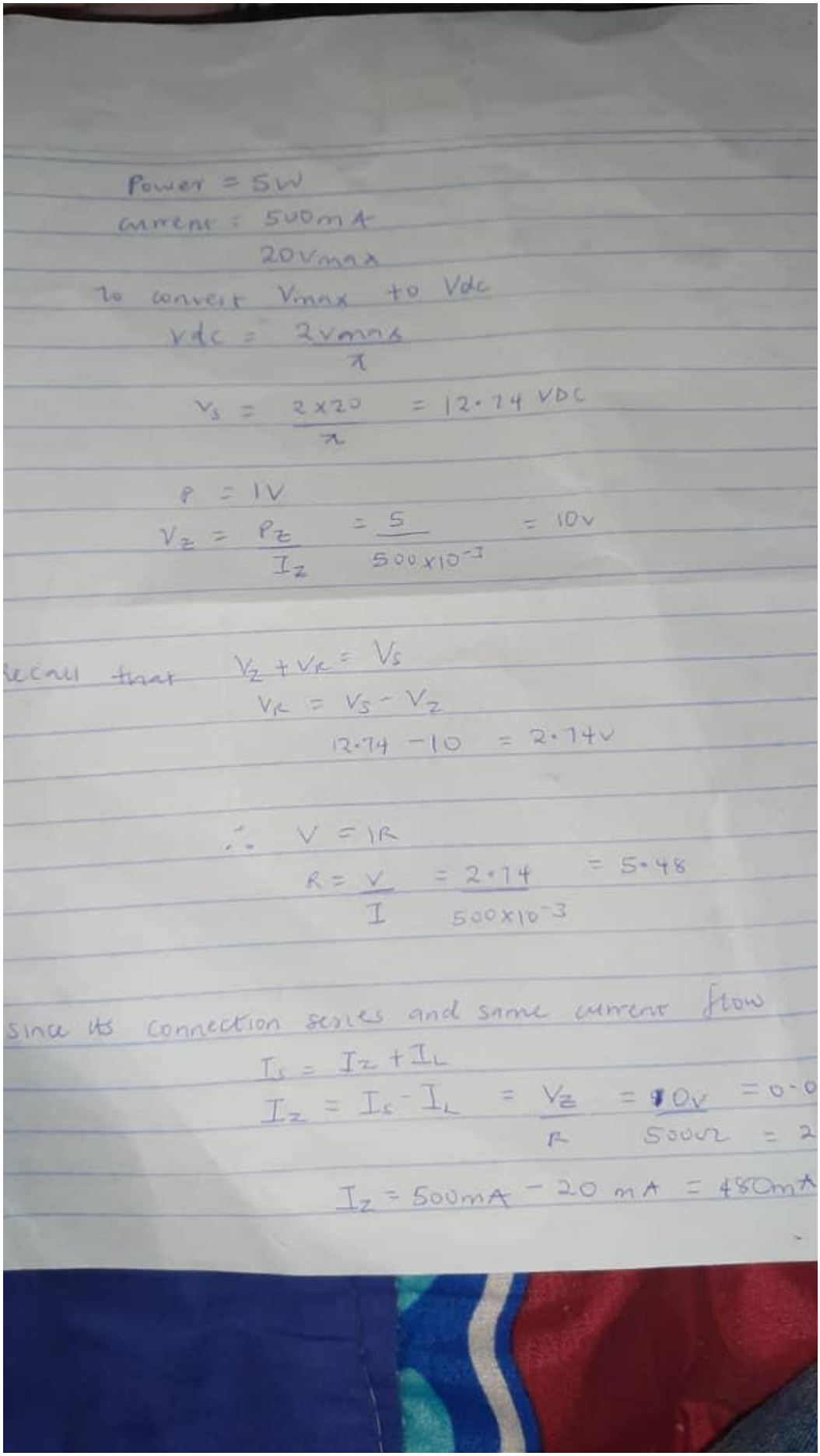

Power = 5W

current = 500mA

20Vmax

To convert Vmax to Vdc

$$Vdc = \frac{2Vmax}{\pi}$$

$$V_s = \frac{2 \times 20}{\pi} = 12.74 \text{ VDC}$$

P = IV

$$V_z = \frac{P_z}{I_z} = \frac{5}{500 \times 10^{-3}} = 10V$$

Recall that $V_z + V_R = V_s$

$V_R = V_s - V_z$

$12.74 - 10 = 2.74V$

$\therefore V = IR$

$$R = \frac{V}{I} = \frac{2.74}{500 \times 10^{-3}} = 5.48$$

Since its connection series and same current flow

$I_s = I_z + I_L$

$I_z = I_s - I_L = \frac{V_z}{R} = \frac{10V}{500\Omega} = 0.0$

$I_z = 500mA - 20mA = 480mA$

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The zener diode behave just like a normal general-purpose diode consisting of a silicon pn junction and when biased in the forward direction, that is anode positive with respect to its cathode, it behaves just like a normal signal diode passing the rated current.

However, unlike a conventional diode that block any flow of current through itself when reverse biased, that is the cathode becomes more positive than the anode, as soon as ~~pos~~ the reverse voltage reaches a predetermined value, the zener diode begins to conduct in the reverse direction.