Optional In Class Exercise Week 14

A ZENER DIODE is a special kind of diode which allows you to apply a voltage across it and it will limit [or ***regulate***] the output voltage to a specific amount that is called its “BREAKDOWN VOLTAGE”. This fact is useful for, among other things, providing a specific voltage to parts of a circuit.

A typical circuit looks like this:

A diagram of electrical circuits

Description automatically generated

From: <https://www.electronics-tutorials.ws/diode/diode_7.html>

As you can see, there are several parameters that are needed in order to calculate the amount of voltage and current that will be supplied to the load. First we need to know the input voltage Vin , then we need to know the series resistance *Rseries* . The Zener breakdown voltage will be the voltage input to the load resistance *RLmin* , and the output current provided through the series resistance will determine the voltage drop across the load resistance. The load resistance specification is the *minimum* resistance of the load.

Your task is to write a program called “Zener.py” for this simple circuit that will take the four parameters from the command line in the order of Vin, Vout, Rseries, and RLmin, and will produce the minimum Zener current in milliamps. Here are the equations:

RseriesCurrent = (Vin – Vout) / Rseries

MaxLoadCurrent = Vout / RLmin

MinZenerCurrent = RseriesCurrent – MaxLoadCurrent