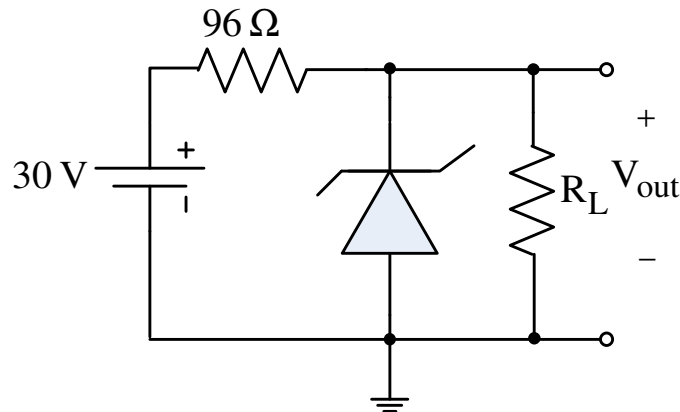


## TUTORIAL 5

**EEE132 2008/2009**

1. State the effects of temperature on the I-V characteristics of the diode. Draw the I-V graph of a diode at two different temperatures to assist you in your explanation.
2. Consider the following circuit. Given:  $V_Z = 10\text{ V}$ ,  $I_{ZK} = 3\text{ mA}$ ,  $I_{ZM} = 90\text{ mA}$  and  $R_Z = 0\ \Omega$ .
  - (i) Determine the minimum and maximum load current to maintain the regulation of the zener diode.
  - (ii) Determine the minimum and maximum  $R_L$ .



3. State 2 types of breakdown in a zener diode. Describe the differences between the two in terms of how they can occur.
4. A zener diode has a  $5\ \Omega$  resistance. The data sheet provides the following values:  $V_{ZT} = 6.8\text{ V}$ ,  $I_{ZT} = 20\text{ mA}$ ,  $I_{ZK} = 1\text{ mA}$  and  $I_{ZM} = 50\text{ mA}$ . What is the voltage across the diode when the current is
  - (i) 30 mA
  - (ii) 10 mA
5. State 2 applications of the zener diode. Draw appropriate diagrams to assist you in describing the operation of the zener diode in these applications.
6. Draw the output voltage for the following zener diode limiting circuits. All the diodes are Si with potential barrier of 0.7 V.

