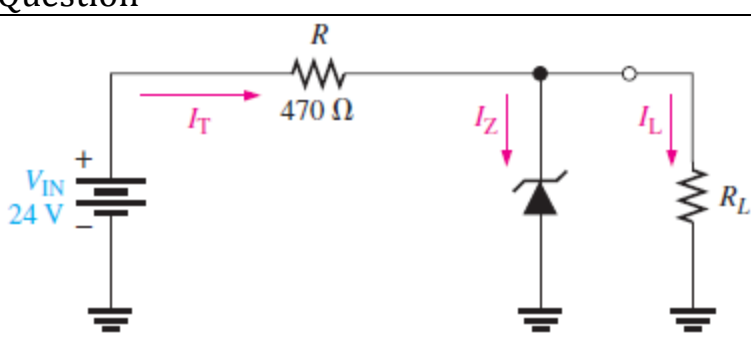
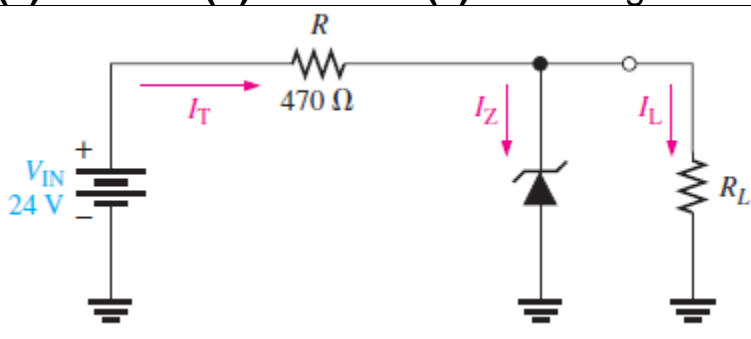
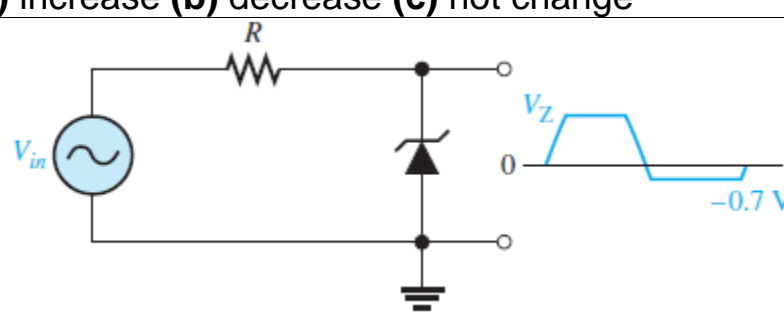


# Electronic Circuits - Tutorial 05

## Special Purpose Diodes

### I

MCQ

#	Question	
1	 <p>If the input voltage in Figure 3-14 is reduced by 2 V, the zener current will  <b>(a) increase (b) decrease (c) not change</b></p>	b
2	 <p>If the zener opens in Figure 3-14, the output voltage will  <b>(a) increase (b) decrease (c) not change</b></p>	a
3	 <p>If the input voltage amplitude in Figure 3-18(a) is increased, the positive output voltage will  <b>(a) increase (b) decrease (c) not change</b></p>	c

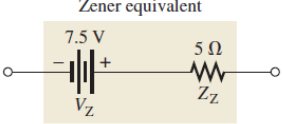


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4	The cathode of a zener diode in a voltage regulator is normally <b>(a)</b> more positive than the anode <b>(b)</b> more negative than the anode <b>(c)</b> at +0.7 V <b>(d)</b> grounded	a
5	For a certain 12 V zener diode, a 10 mA change in zener current produces a 0.1 V change in zener voltage. The zener impedance for this current range is <b>(a)</b> 1 $\Omega$ <b>(b)</b> 100 $\Omega$ <b>(c)</b> 10 $\Omega$ <b>(d)</b> 0.1 $\Omega$	c



Problems:

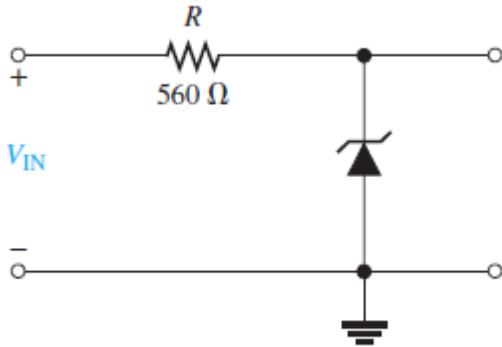
1	A certain zener diode has a $V_Z = 7.5 \text{ V}$ and an $Z_Z = 5 \Omega$ at a certain current. Draw the equivalent circuit.
1	<p>..... See Figure ANS-7. ....</p> <p>.....</p> <div style="text-align: center;">  <p>Zener equivalent</p> </div> <p>.....</p>
2	When the reverse current in a particular zener diode increases from 20 mA to 30 mA, the zener voltage changes from 5.6 V to 5.65 V. What is the impedance of this device?
2	<p>.....</p> <p>..... <math>5 \Omega</math> .....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
3	A certain zener diode has the following specifications: $V_Z = 6.8 \text{ V}$ at $25^\circ\text{C}$ and $TC = +0.04\%/^\circ\text{C}$ . Determine the zener voltage at $70^\circ\text{C}$ .
3	<p>.....</p> <p>..... <math>6.92 \text{ V}</math> .....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>



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4

Repeat Problem 6 with  $Z_Z = 20 \Omega$  and  $V_Z = 14 \text{ V}$  at  $30 \text{ mA}$ .



4

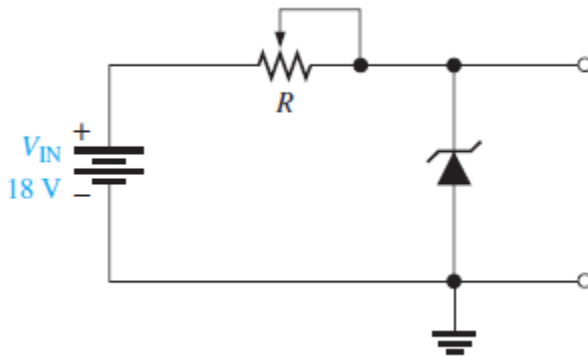
.....  
..... 14.3 V .....  
.....  
.....



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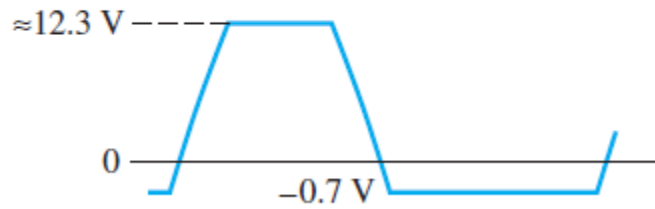
5

A 20 V peak sinusoidal voltage is applied to the circuit in Figure 3–69 in place of the dc source. Draw the output waveform. Use the parameter values established in Problem 8.

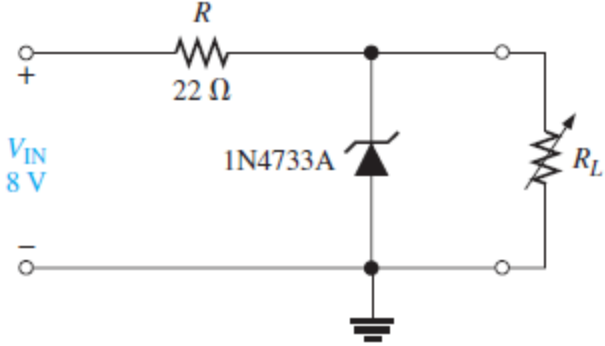


5

See Figure ANS–8.





6	<p>Find the load regulation expressed as a percentage in Problem 10.</p> 
6	<p>.....</p> <p>..... 10.3% .....</p> <p>.....</p> <p>.....</p> <p>.....</p>
7	<p>The no-load output voltage of a certain zener regulator is 8.23 V, and the full-load output is 7.98 V. Calculate the load regulation expressed as a percentage. Refer to Chapter 2, Equation 2-15.</p>
7	<p>.....</p> <p>..... 3.13% .....</p> <p>.....</p> <p>.....</p> <p>.....</p>
8	<p>The output voltage of a zener regulator is 3.6 V at no load and 3.4 V at full load. Determine the load regulation expressed as a percentage. Refer to Chapter 2, Equation 2-15.</p>
8	<p>.....</p> <p>..... 5.88% .....</p> <p>.....</p> <p>.....</p> <p>.....</p>