



## Sheet (8)

1. What are the basic components in a series regulator?
2. A certain series regulator has an output voltage of 8V. If the op-amp's closed loop gain is 4, what is the value of the reference voltage?
3. How does the control element in a shunt regulator differ from that in a series regulator?
4. What is one advantage of a shunt regulator over a series type? What is a disadvantage?
5. What are the three terminals of a fixed-voltage regulator?
6. What is output voltage of a 7809? Of a 7915?
7. What are the three terminals of an adjustable-voltage regulator?
8. What external components are required for basic LM317 configuration?
9. (a) Determine the output voltage for the series regulator shown in figure 1.  
(b) If  $R_3$  is increased to  $4.7\text{K}\Omega$ , what happens to output voltage?  
(c) What is the output voltage if zener voltage becomes  $2.7\text{V}$ ?

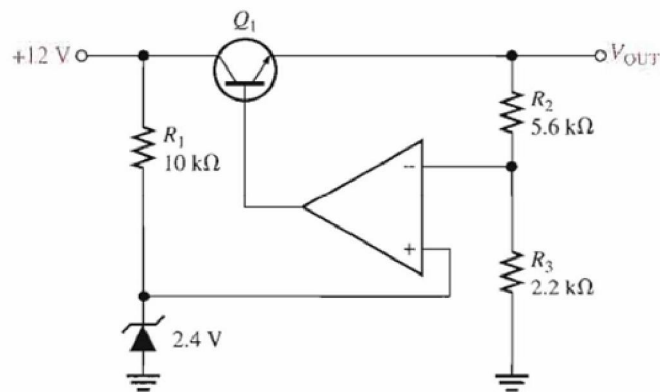


Figure 1

10. (a) In shunt regulator of figure 2, Assume  $I_L$  remains constant and  $V_{IN}$  changes by 1V, what is the change in the collector current of  $Q_1$ ?  
 (b) If the maximum allowable input voltage is 25V, what is the maximum possible output current when the output is short-circuited? What power rating should  $R_1$  have?

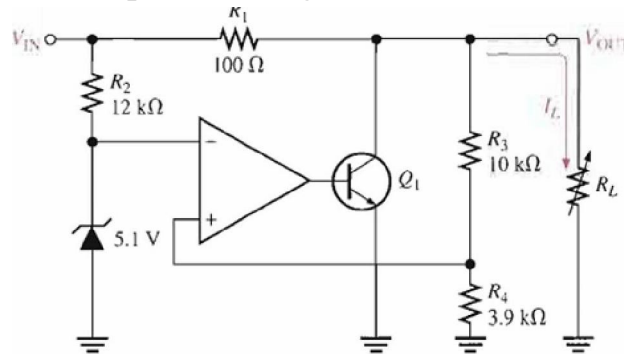


Figure 2

11. Determine the output voltage of IC voltage regulator seen in figure 3, if  $I_{ADJ}=50\mu A$ , then with no load connected, how much current is there through the regulator with neglecting the adjustment terminal current.

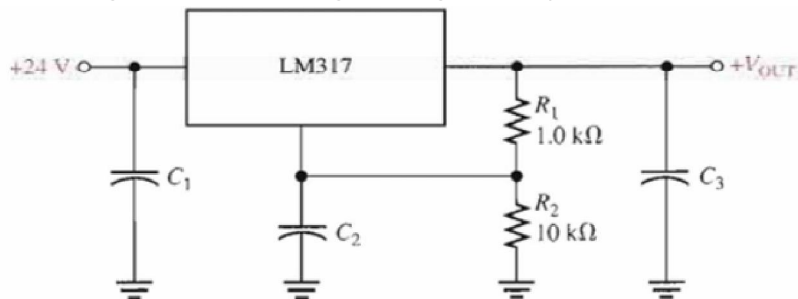


Figure 3

12. Determine the minimum and maximum output voltages for the circuit in figure 4 if  $I_{ADJ}=50\mu A$

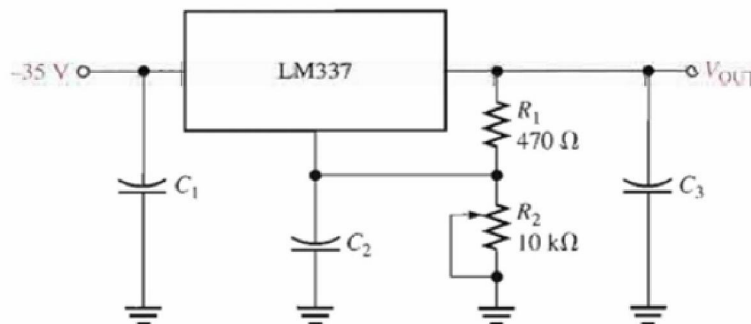


Figure 4

Good Luck