Q1) cylindrical tube of raids 2mm and length 7 cm have atoms density $32*10^{20}$ m^{-3} to produce N-type semiconductor calculate

1- Conductivity and resistivity
2- Resistance of tube
3- Calculate new tube length to produce resistance 50Ω

(hint: $e=1.6*10^{-19}$,$\mu_e=0.36$ $m^2/(v.sec)$)

Q2) cylindrical tube of raids 3mm and length 320mm have atoms density $40*10^{19}$ m^{-3} to produce P-type semiconductor calculate (8 degree)

1- Conductivity and resistivity
2- Resistance of tube
3- Calculate new tube rides to produce resistance 60Ω

(hint: $e=1.6*10^{-19}$,$\mu_h=0.18$ $m^2/(v.sec)$)

Q3) Determine the resistance of a silicon sample having an area of 1 cm^2 and a length of 3 cm for atomic density $32*10^{20}$ m^{-3} of N-type semiconductor.

Q4) Repeat part (Q3) if the length is 1 cm and the area 4 cm^2.

Q5). Describe the difference between n-type and p-type semiconductor materials.

Q6). Describe the difference between donor and acceptor impurities.

Q7). Describe the conditions established by forward- and reverse-bias conditions on a p-n junction diode and how the resulting current is affected.

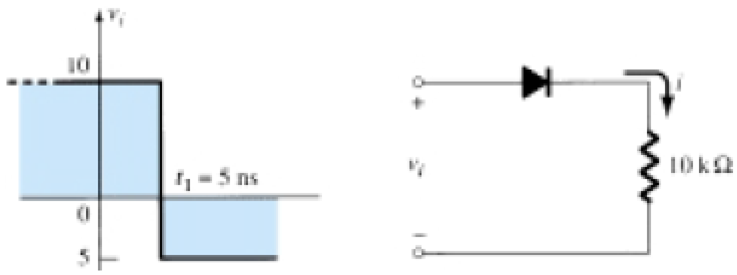
Q8). Describe how you will remember the forward- and reverse-bias states of the p-n junction diode.

Q9). Determine the diode current at 30°C (room temperature) for a silicon diode with Is= 50 nA and an applied forward bias of 0.6 V.

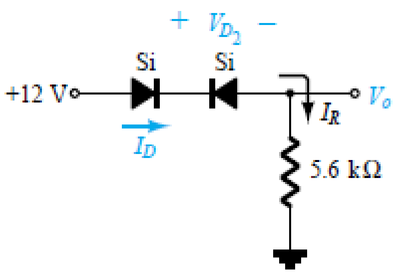
Q10). Repeat (Q9) for T = 100°C.

Q11). Determine the diode current at room temperature for a silicon diode with Is= 0.1 A at a reverse-bias potential of 10 V.

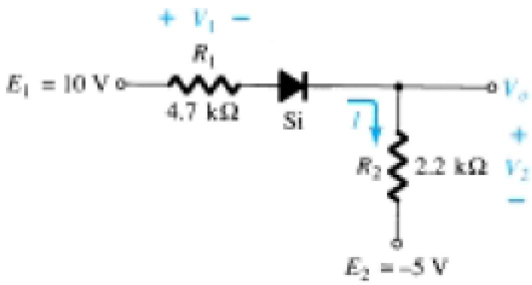
Q12). Sketch the waveform for (i and Vo) of the cct. shown below



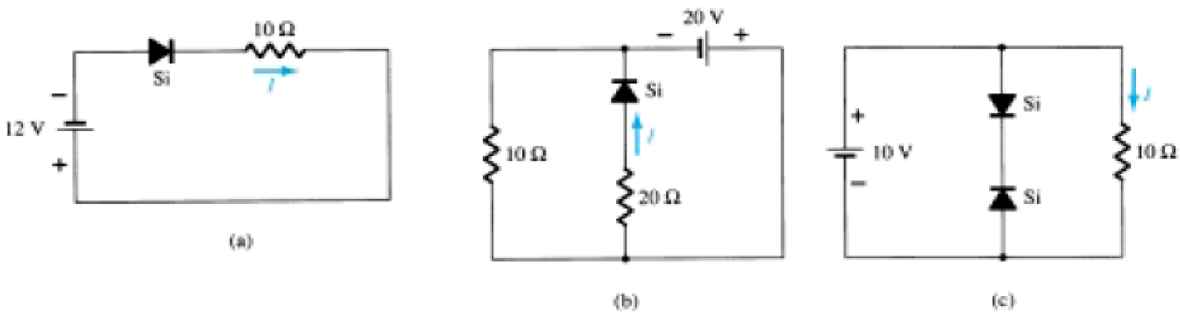
Q13). Determine I_D,V_{D2}, and Vo for the circuit shown below if (V_o = 0.6 v and R_D=100 ohm)



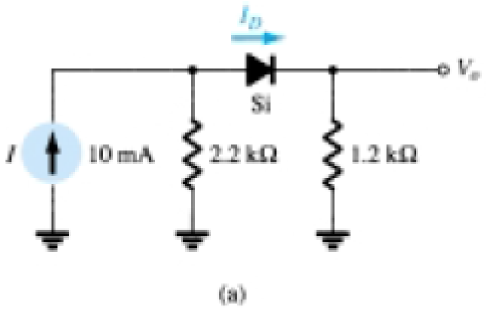
Q14) Determine I, V_1, V_2, and V_o for the cct. shown below if (V_o = 0.6 v and R_D=100 ohm)



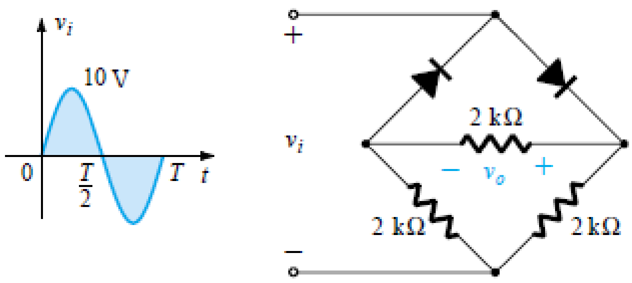
Q15) Determine the current I for each of the three ccts. (V_o = 0 v and R_D=100 ohm)



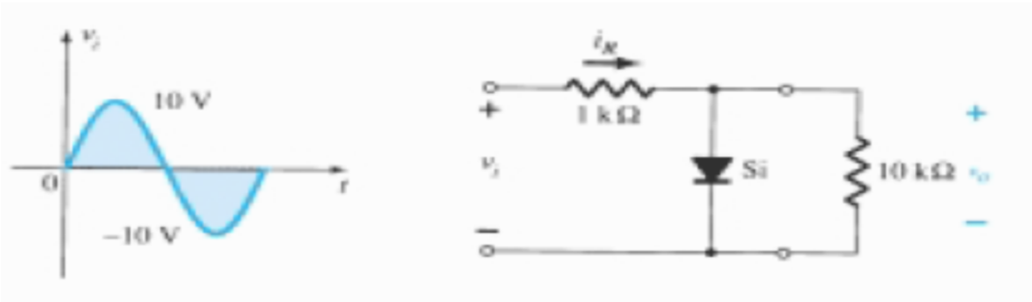
Q16) Determine Vo and I_D for the cct. shown below (V_o = 0 v and R_D=400 ohm)



Q17) Determine the output waveform for the cct. shown below and calculate the output required PIV of each diode



Q18) For the cct. shown below , sketch vo and i_R.



Q19) A FWR center tab transformer with a 120-V sinusoidal input and transformer ratio 10:1 has a load resistor of 1000 ohm.

(a) If silicon diodes are employed, what is the dc voltage available at the load?

(b) Determine the required PIV rating of each diode.

(c) Find the maximum current through each diode during conduction.

(d) What is the DC power and ac power of the output wave?

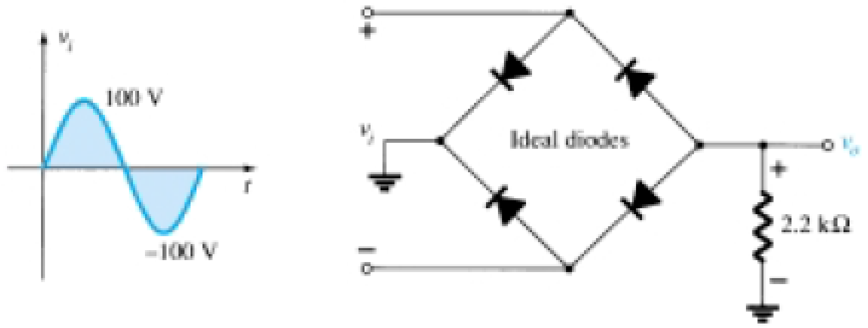
Q20) A FWR shown below find

(a) If silicon diodes are employed, what is the dc voltage available at the load?

(b) Determine the required PIV rating of each diode.

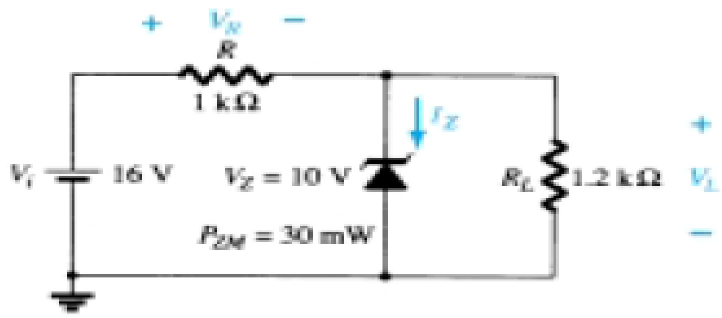
(c) Find the maximum current through each diode during conduction.

(d) What is the DC power and ac power of the output wave?



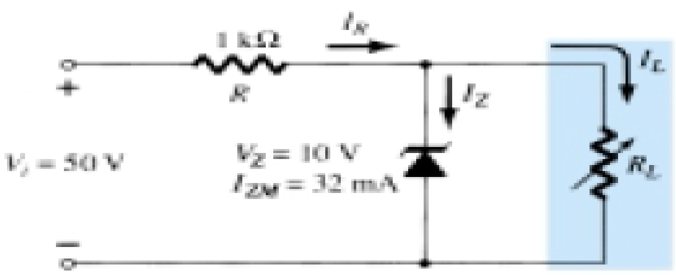
Q21) (a) For the Zener diode cct. shown below, determine V_L, V_R, I_Z, and P_Z.

(b) Repeat part (a) with RL = 3 k_.

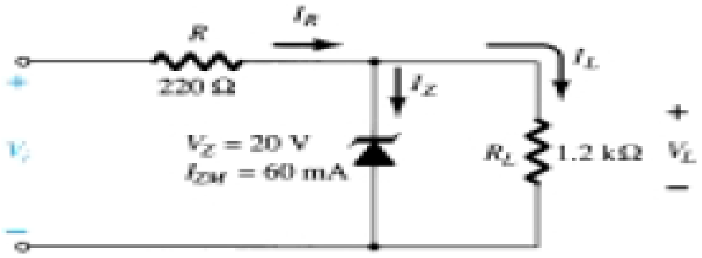


Q22) (a) For the cct. shown below determine the range of R_L and I_L .

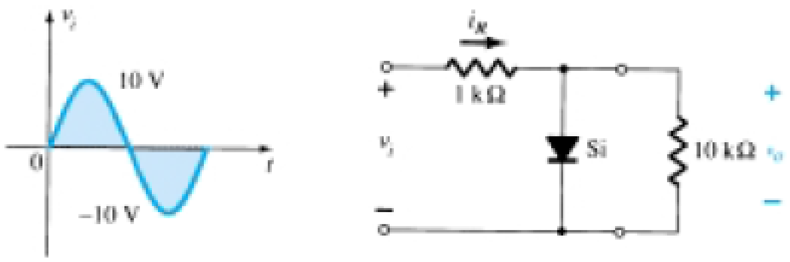
b) Determine the maximum zener diode power.



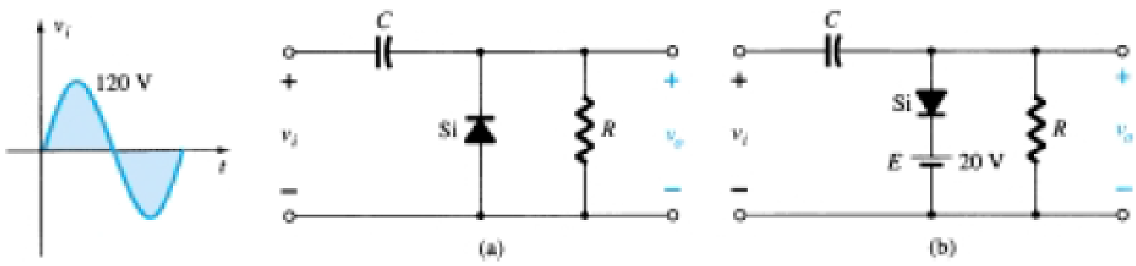
Q23) Determine the range of values of Vi that will maintain the Zener diode for the cct. shown below in the “on” state.



Q24) For the cct. shown below sketch v_o and i_R.

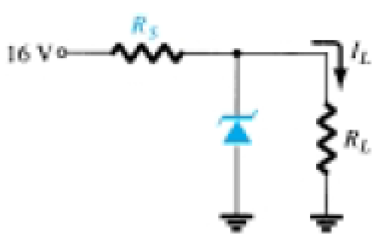


Q25) Sketch v_o for each ccts. Shown below for the input shown.



Q26) Design a voltage regulator that will maintain an output voltage of 20 V across a 1500 ohm load with an input 50 V. That is, determine the proper value of Rs and the maximum current I_Z.

Q27) Design the cct. shown below to maintain V_L= 12 V for a load variation (I_L) from 0 to 200 mA. That is, determine Rs, V_Z and P_{Zmax} for the Zener diode.



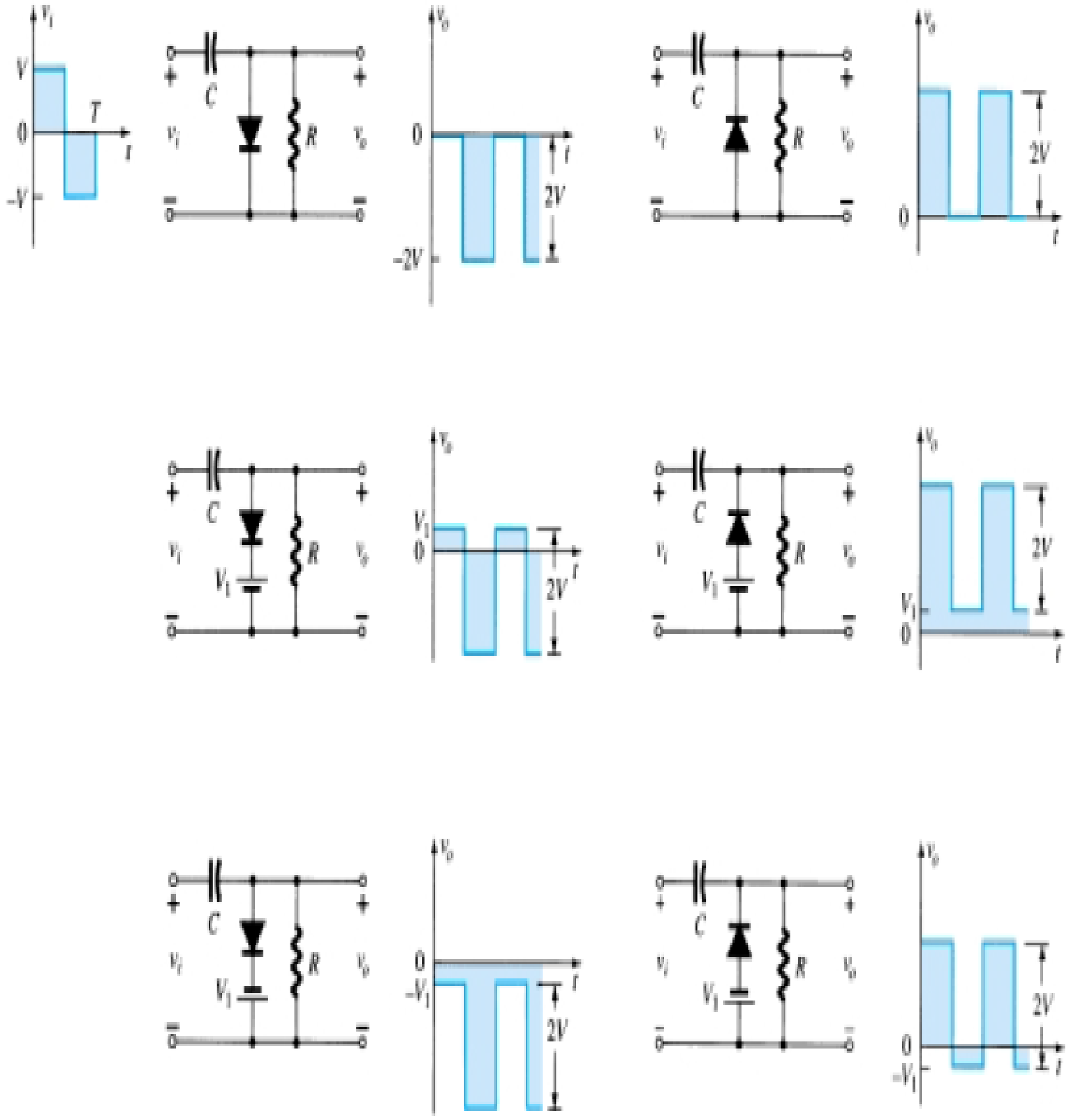


Figure 2.103 Clamping circuits with ideal diodes ($5\tau = 5RC \gg T/2$).

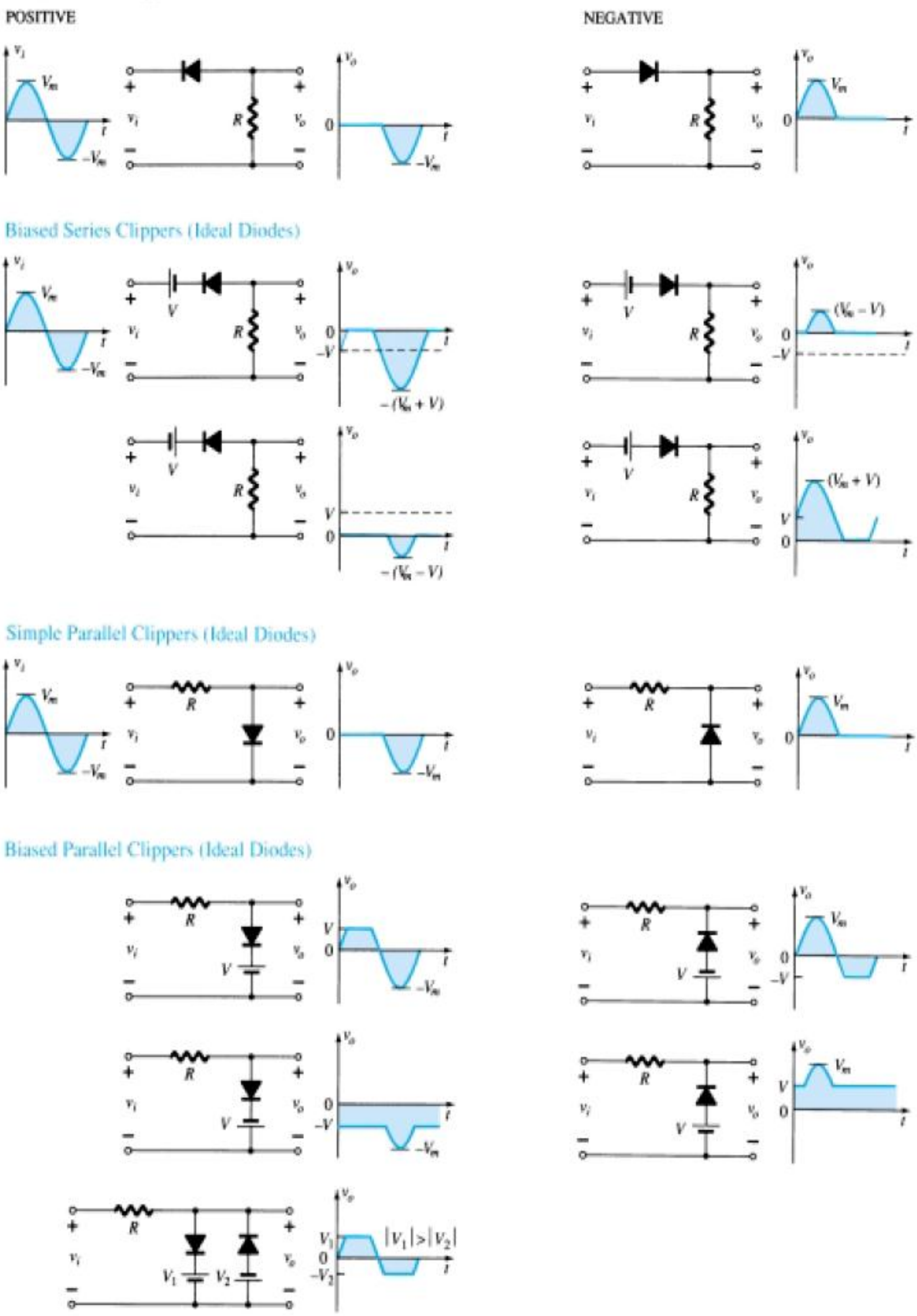


Figure 2.91 Clipping circuits.