# Solution to Assignment 2 (Diodes)
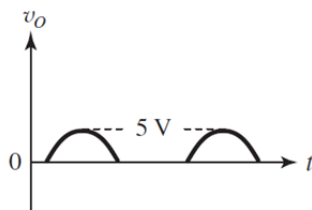
4.4

The best way is to draw the transfer function, for example

(a) In this circuit, when D is on (Vi >0) Vo=Vi otherwise it is 0

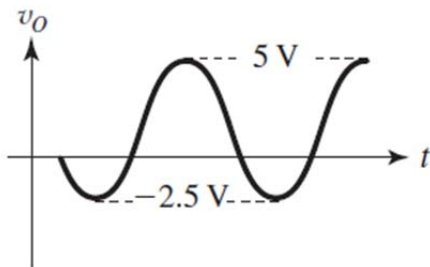The output looks like with Vp+ +5v, VP- = -5v and f =1Khz



In (c) neither diode is conducting, output = 0 all the time VP+=VP-=0 f=0

In (i) when Vi>0 Vo=Vi

When Vi<0 D is On and Vo=0.5Vi



Problem 4.6

| A | B | X | Y |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 |

Problem 4.9

Assume D1 and D2 ON, V=0, I (D2) =(0-(-3) )/6=0.5A

I(D1)=(3-0)/12 = 0.25A

I=0.25A up, can not be, wrong assumption.

D1=OFF, D2=ON

V=-1V I=0 (to get V a voltage divider between +3,-3 with 12,6Kohm)

4.10

Use thevenin to change the 2 10K resistor and 5V source to 2.5V and 5K redsisitor and olve the circuit

4.20

I=IS*exp(VD/VT) substitute and solve

4.38

Vd=0.7 ➜ id1=(v-0.7)/R

Vd=0.6 ➜ id1=(v-0.6)/R  for the difference to be 1%

v-0.6 = 1.01(v-0.7)

v=10.7V

substitute with V=3V and R=1k, the difference is 4%

4.51

The current in each diode is I/2, rd=VT/(I/2) = 0.05/I

Draw the equivalent circuit, and calculate Vo/vi

I=0 → V0=0

I=1e-6 rd = 50k vo/vi=0.167

I=10e-6 rd = 5k vo/vi=0.667


4.63

4.72