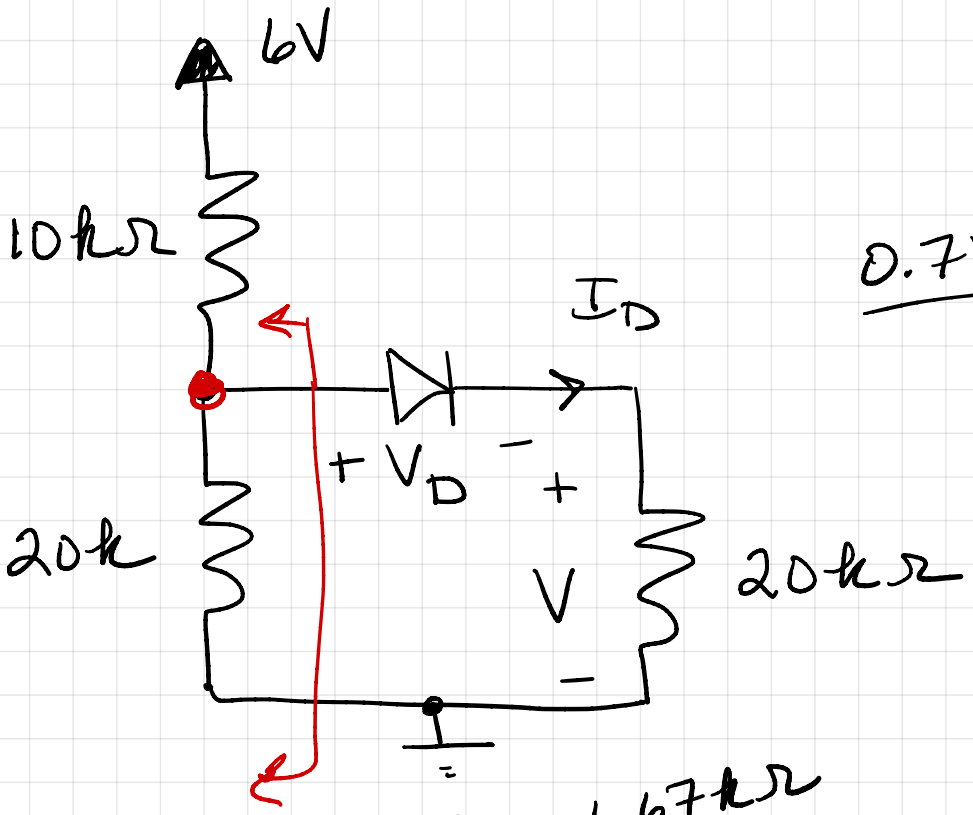


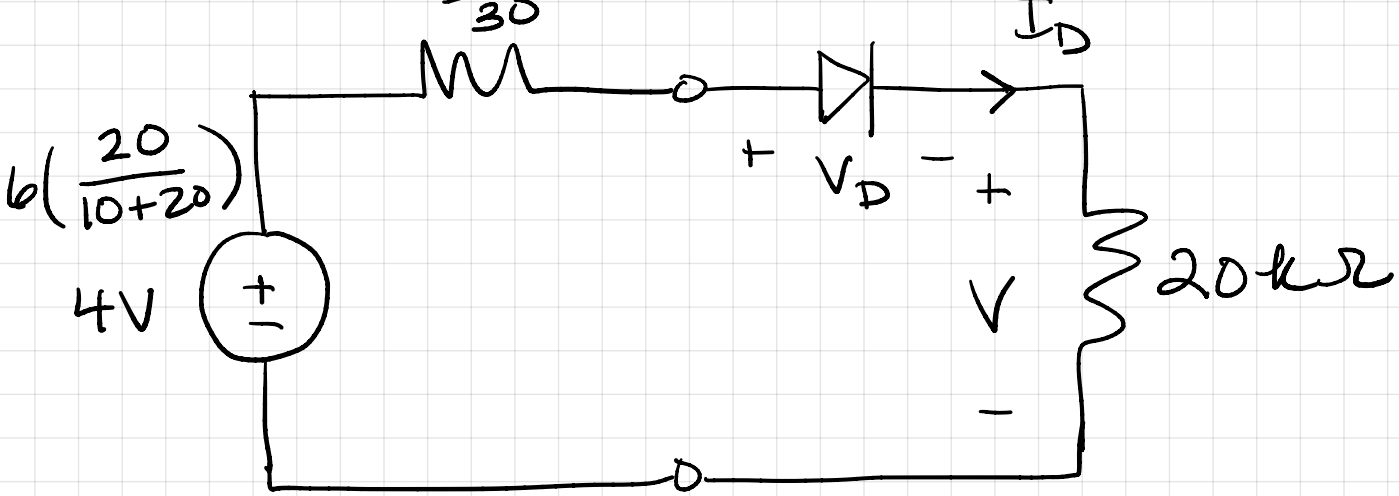
Apply

ideal

0.7V ← constant drop

exponential model

$\frac{200}{30} = 6.67\text{k}\Omega$



ideal $V_D = 0$

$$V = 4\left(\frac{20}{20+6.67}\right)$$

$$\boxed{V = 3\text{V}}$$

$$I_D = \frac{4}{26.67} = 0.15\text{mA}$$

constant drop

$V_D = 0.7\text{V}$

$$I_D = \frac{4 - 0.7}{26.67\text{k}\Omega}$$

$$I_D = 0.124\text{mA}$$

$$\boxed{V = (I_D\ 20) = 2.48\text{V}}$$

```
clc

Vdd=4;
Rs=6.6667;
Rl=20;

Vd=0.7;
Id=1; %units of mA
x=1;
count=0;

while x >0.000000001
    Idtest=(Vdd-Vd)/(Rs+Rl);
    Vdtest=Vd+0.025*log(Idtest/Id);
    x=abs(Vd-Vdtest);
    Vd=Vdtest;
    Id=Idtest;
    count=count+1;

end

Id
Vd
count
Vl=Id*20
```

forexp
1mA, 0.7V

$I_D = 0.1257\,mA$

$V_D = 0.6482\,V$

$V = 2.5139\,V$