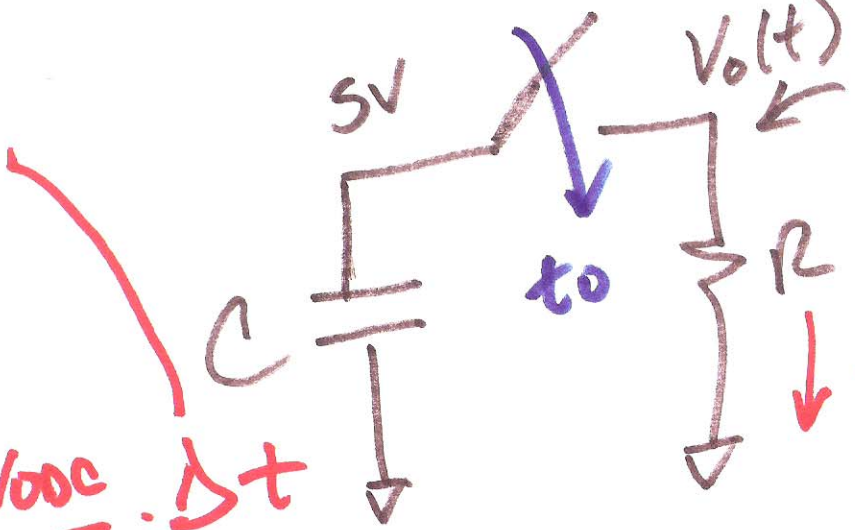
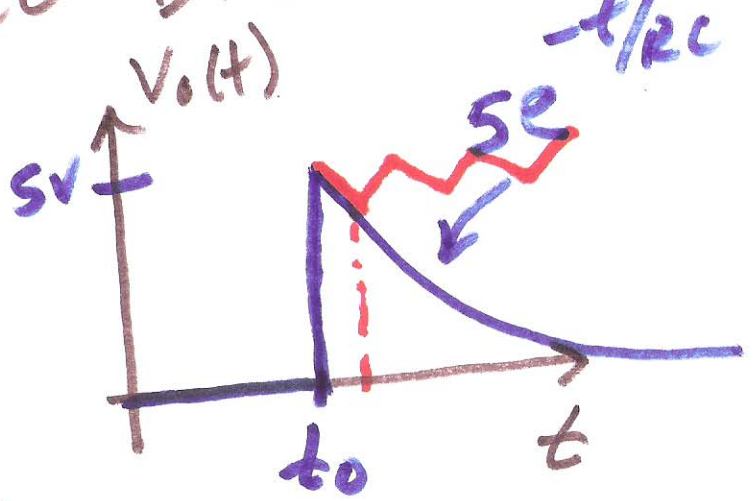
Feb. 26, 2014

Lecture 10

EE 320 Electronics

$\Delta t < \frac{1}{60}$





$\frac{5}{R} = I_{CONST}$

$\Delta V_o = \frac{V_{ODC}}{RC} \cdot \Delta t$

$I = C \frac{dV}{dt}$

ΔV_o = change in V_{oDC}

$\frac{V_{ODC}}{R} = C \frac{\Delta V_o}{\Delta t}$

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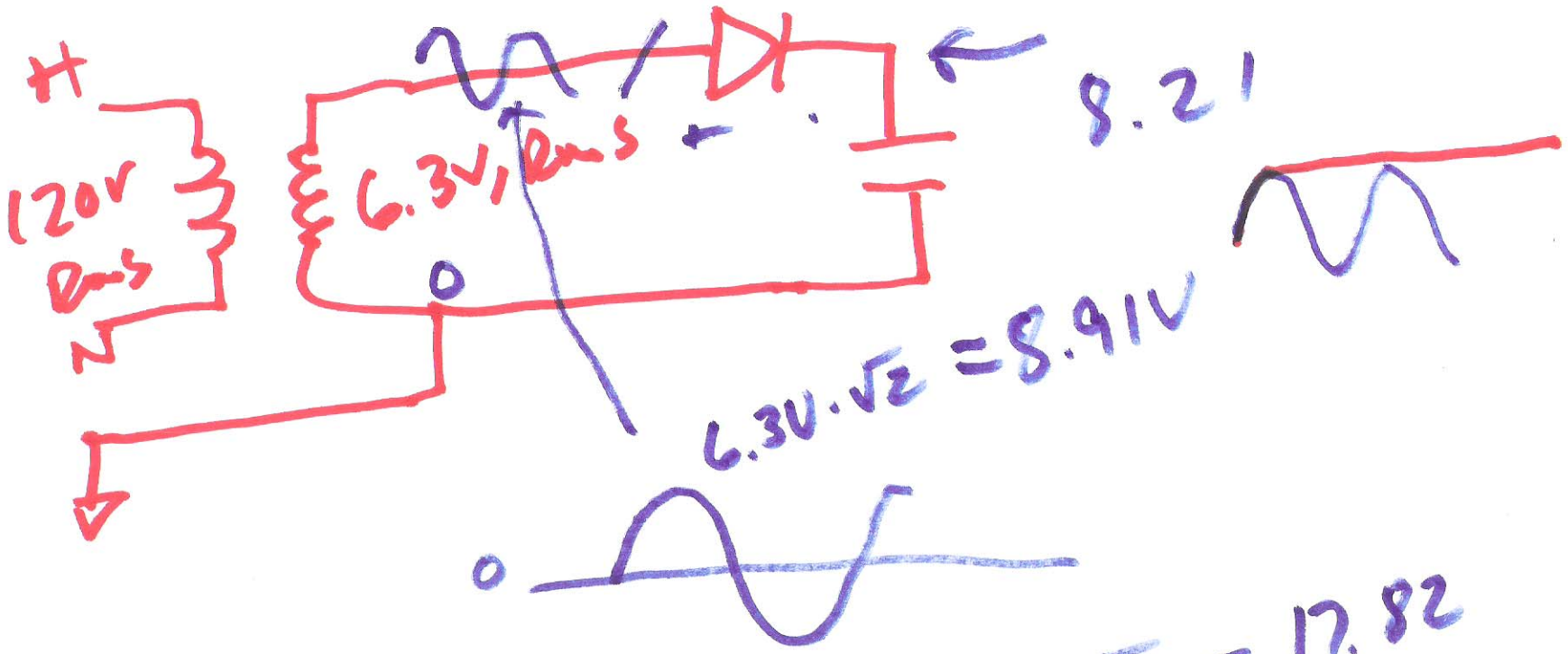
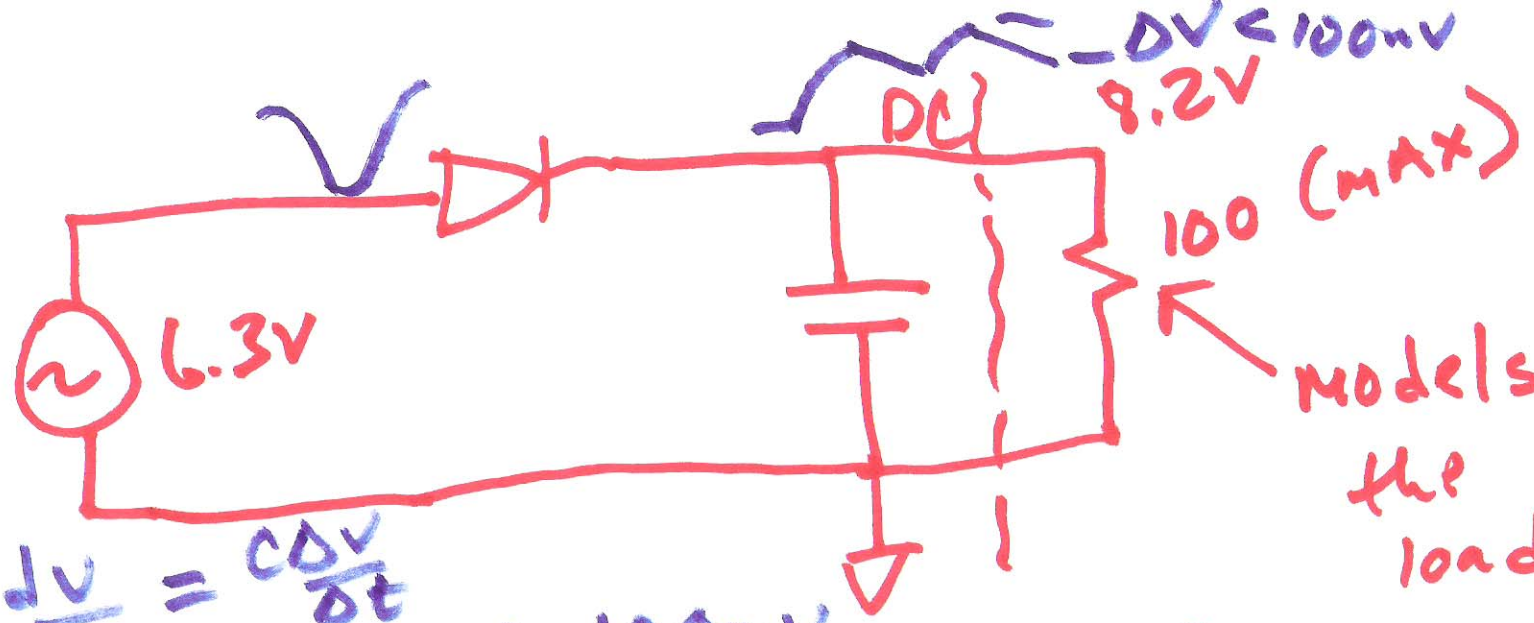


$V_{PP} = 2 \cdot 6.3V \cdot \sqrt{2} = 17.82$

$T = 16.67\,ms \quad f = 60\,Hz$



$$I = C\frac{dV}{dt} = C\frac{\Delta V}{\Delta t}$$

$\Delta V < 100mV$

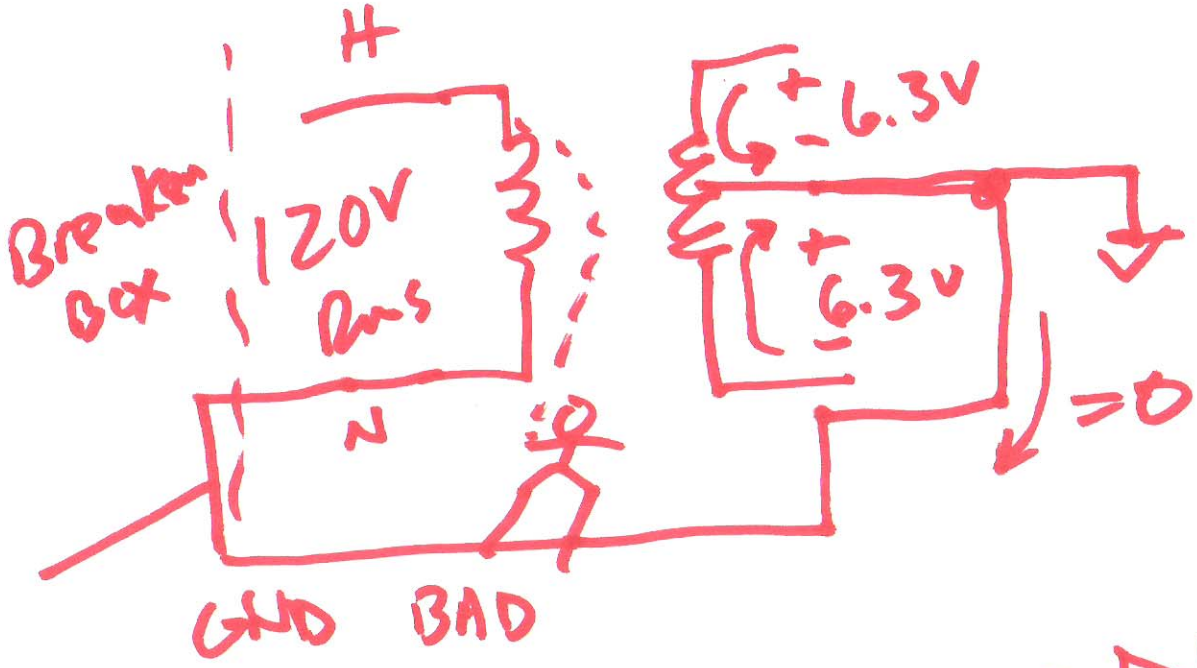
$$\frac{8.2}{100} = I_{max} = 82mA$$

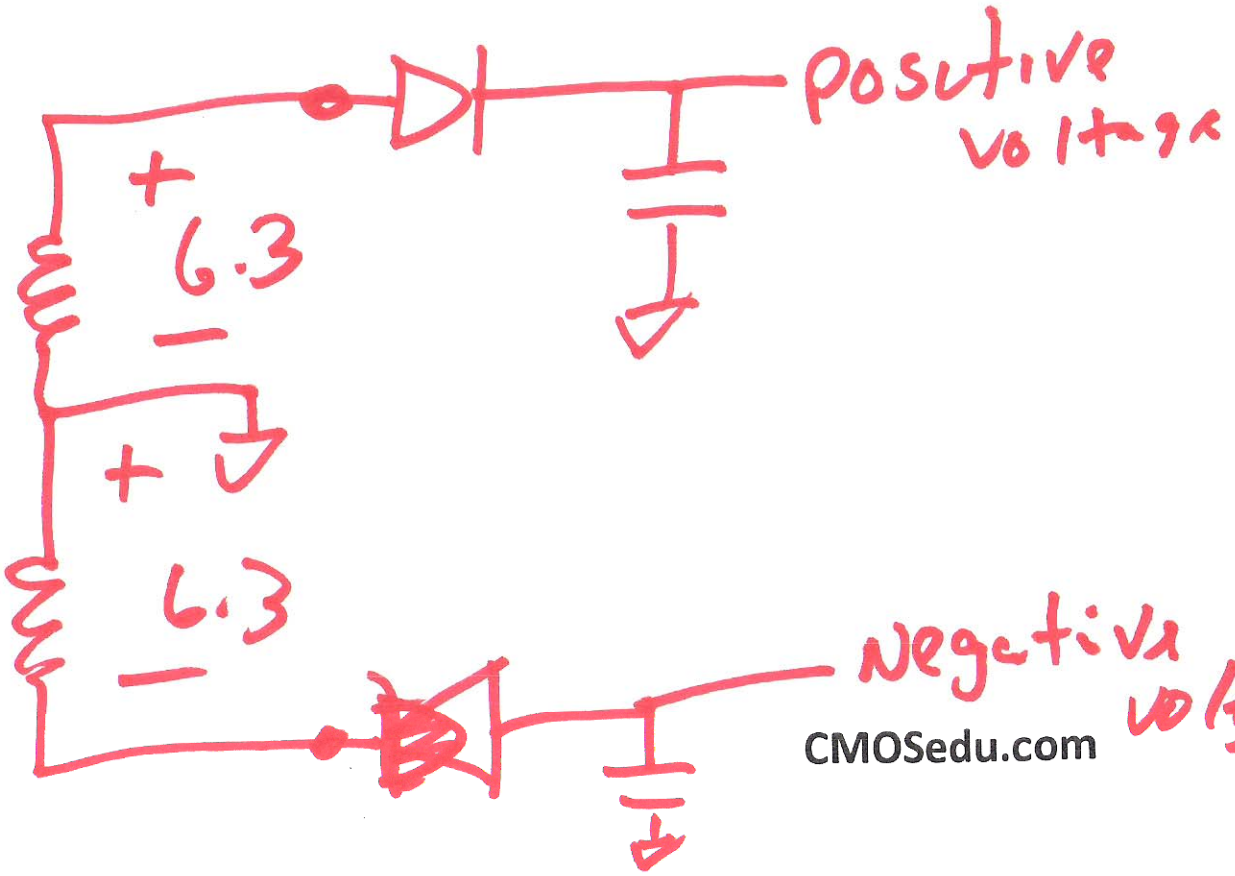
$$\frac{8.2}{100}\cdot\frac{\Delta t}{C} = \Delta V$$

$$C \geq \frac{8.2V}{100\Omega}\cdot\frac{16.67ms}{100mV} = 13.7mF$$

milliFarad 10^{-3}

$$\Delta t = 16.67ms$$





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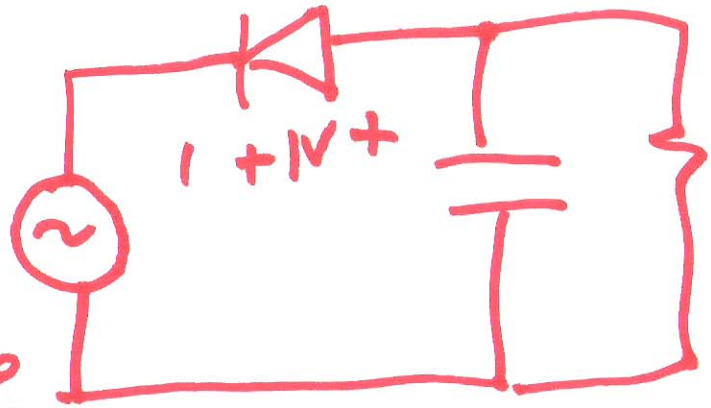


$12.6V \pm 10\%$

$12.6 + 1.26 = 13.86$

$12.6 - 1.26 = 11.34V$

peak $= 19.6 \rightarrow 18.6$

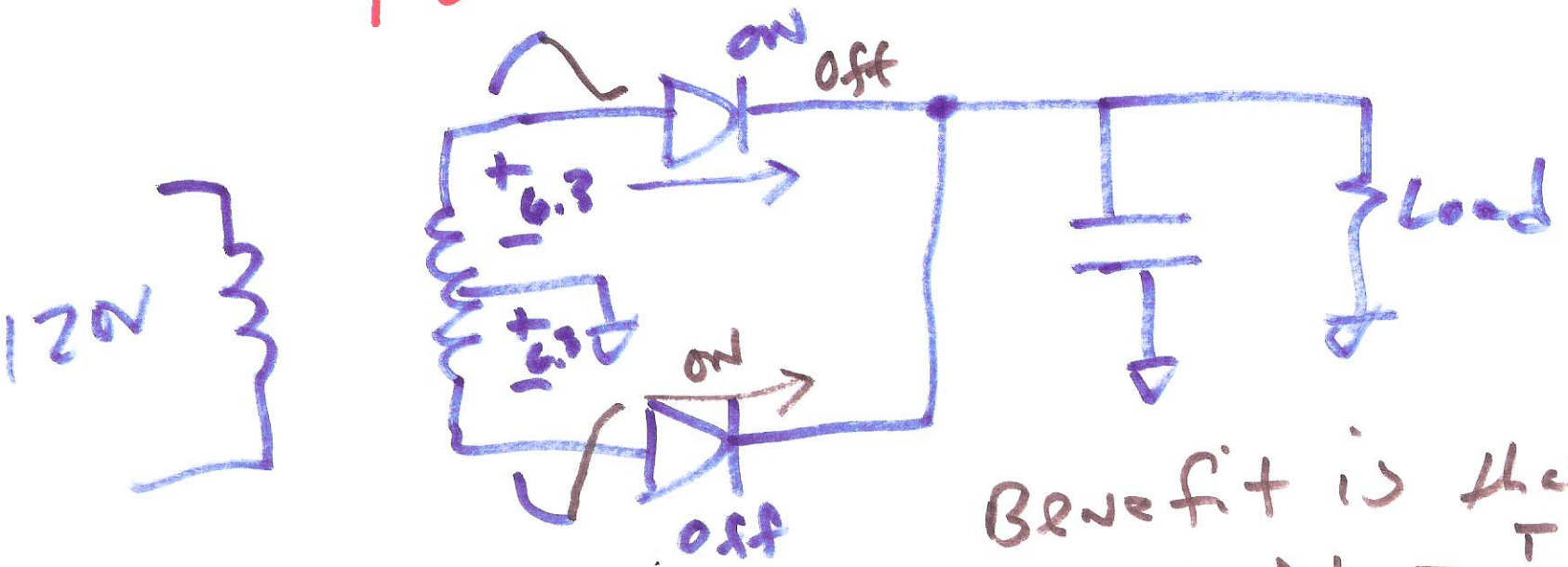
M.V $= 16.03 \rightarrow 15.03$

$-18.6V$

-15.03

5)

Full-wave rectifier

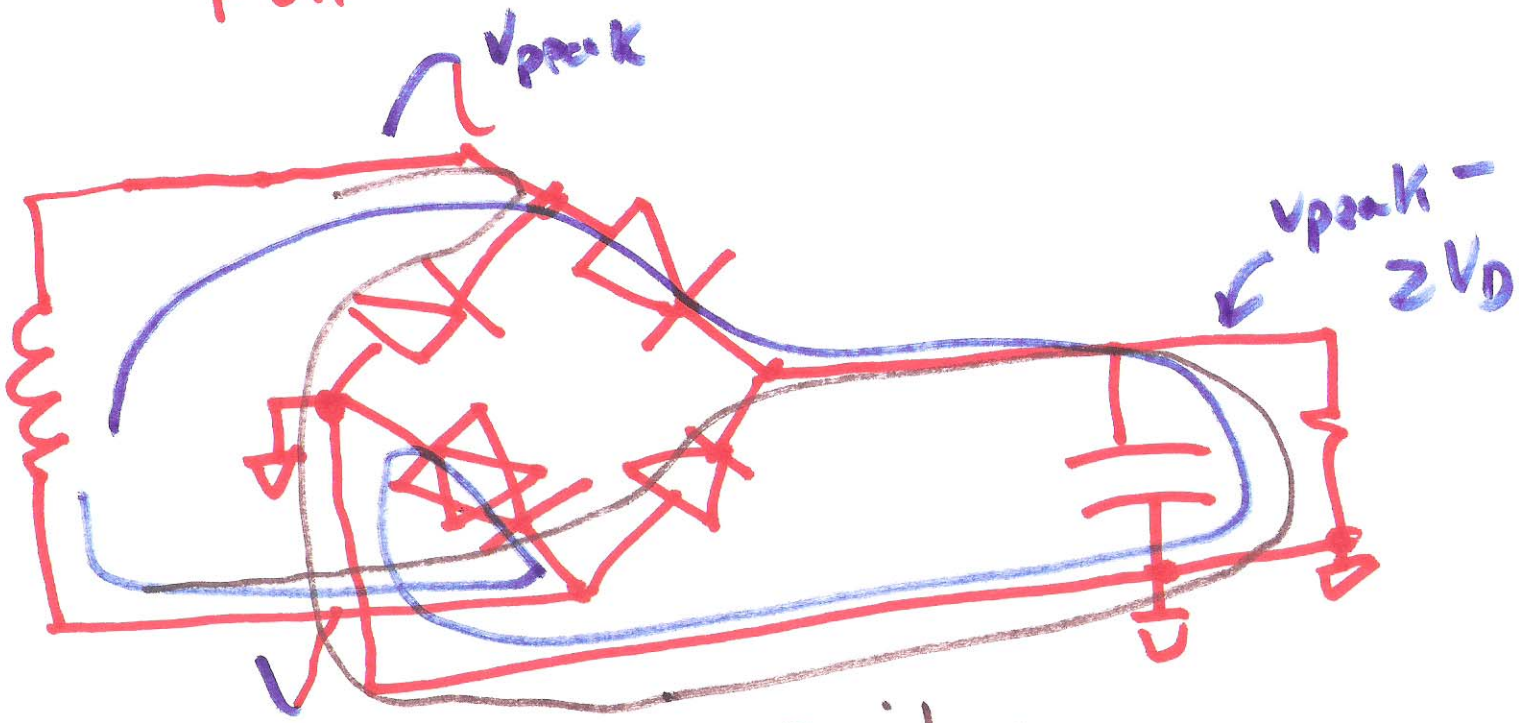


Benefit is that now $\Delta t = \frac{T}{2}$

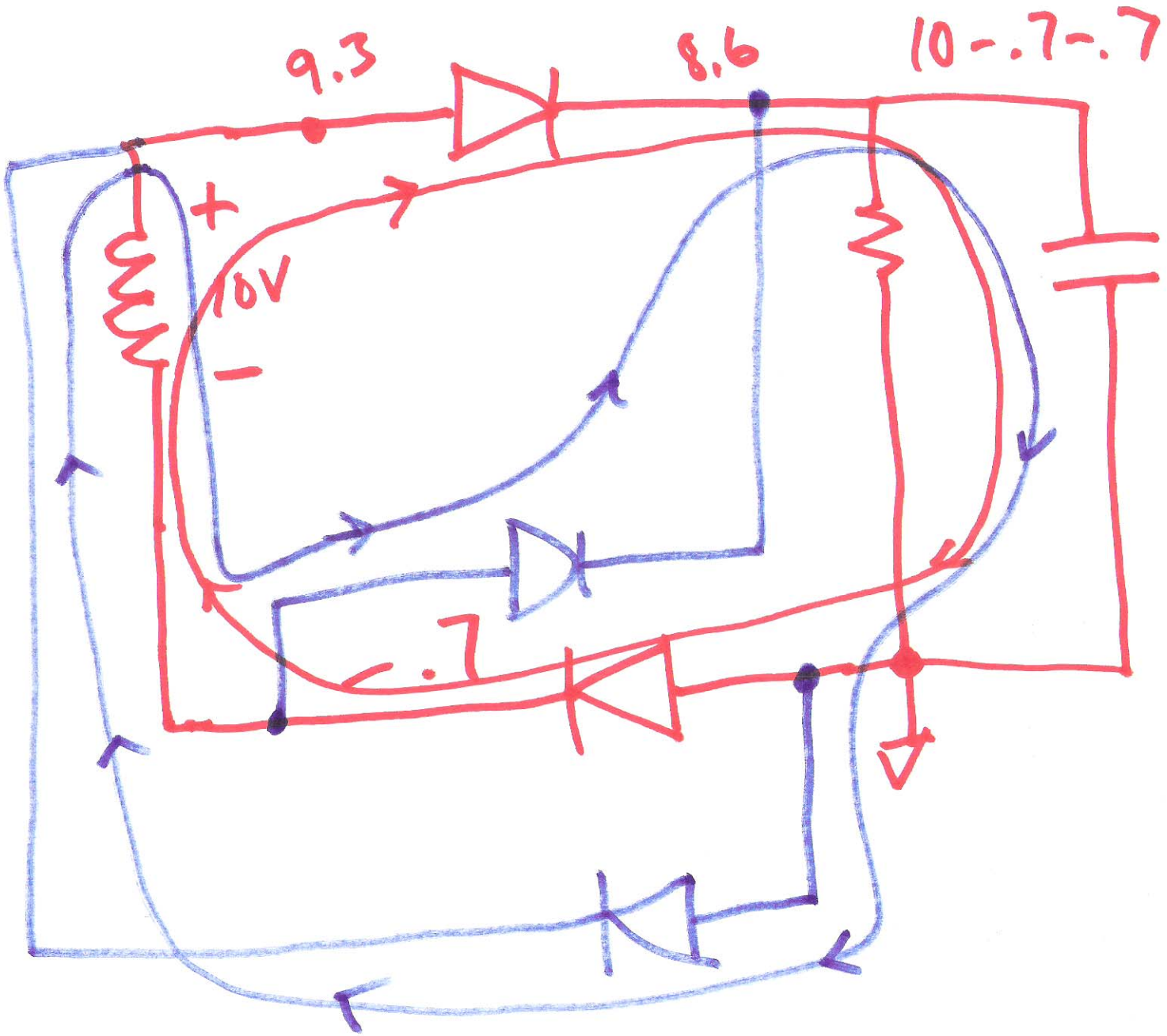
$\Delta t = \frac{16.67\ ms}{2}$

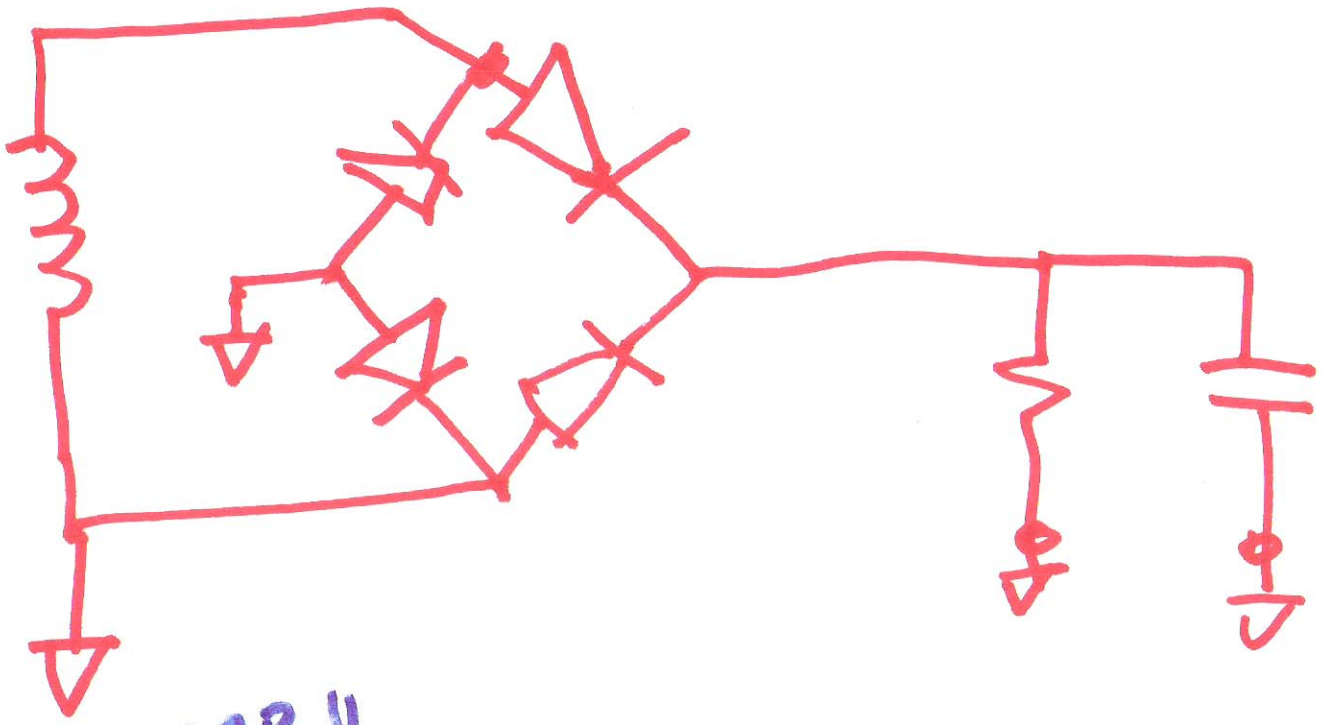
$= 8.35\text{-}s$

Full-wave rectifier

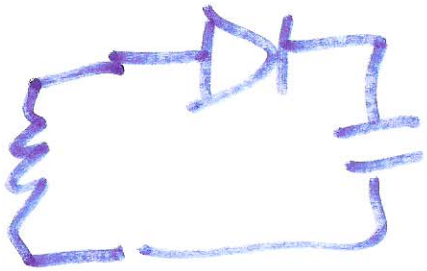


Diode Bridge


9.3
8.6
10-.7-.7
+
10V
−
.7



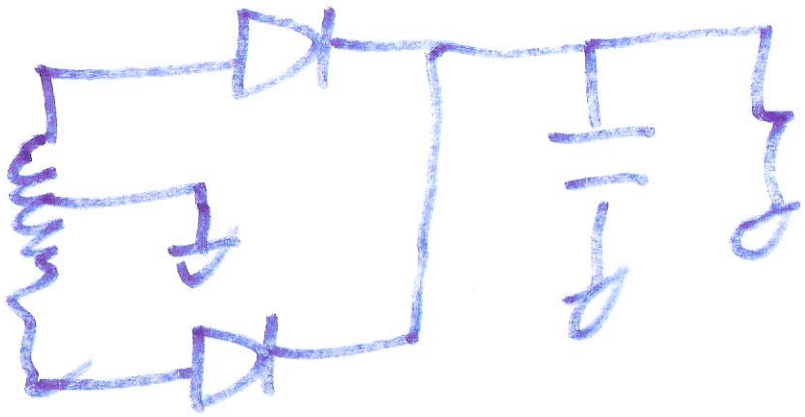
Summary



Half-wave
NO-center tap
needs bigger cap

only one diode drop

Full-wave with center tap



only one diode drop

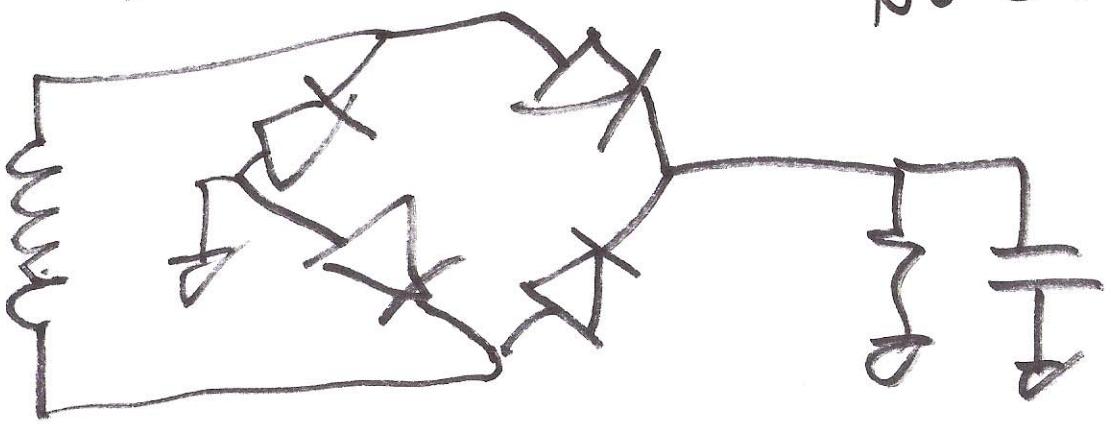
need center tap

smaller cap

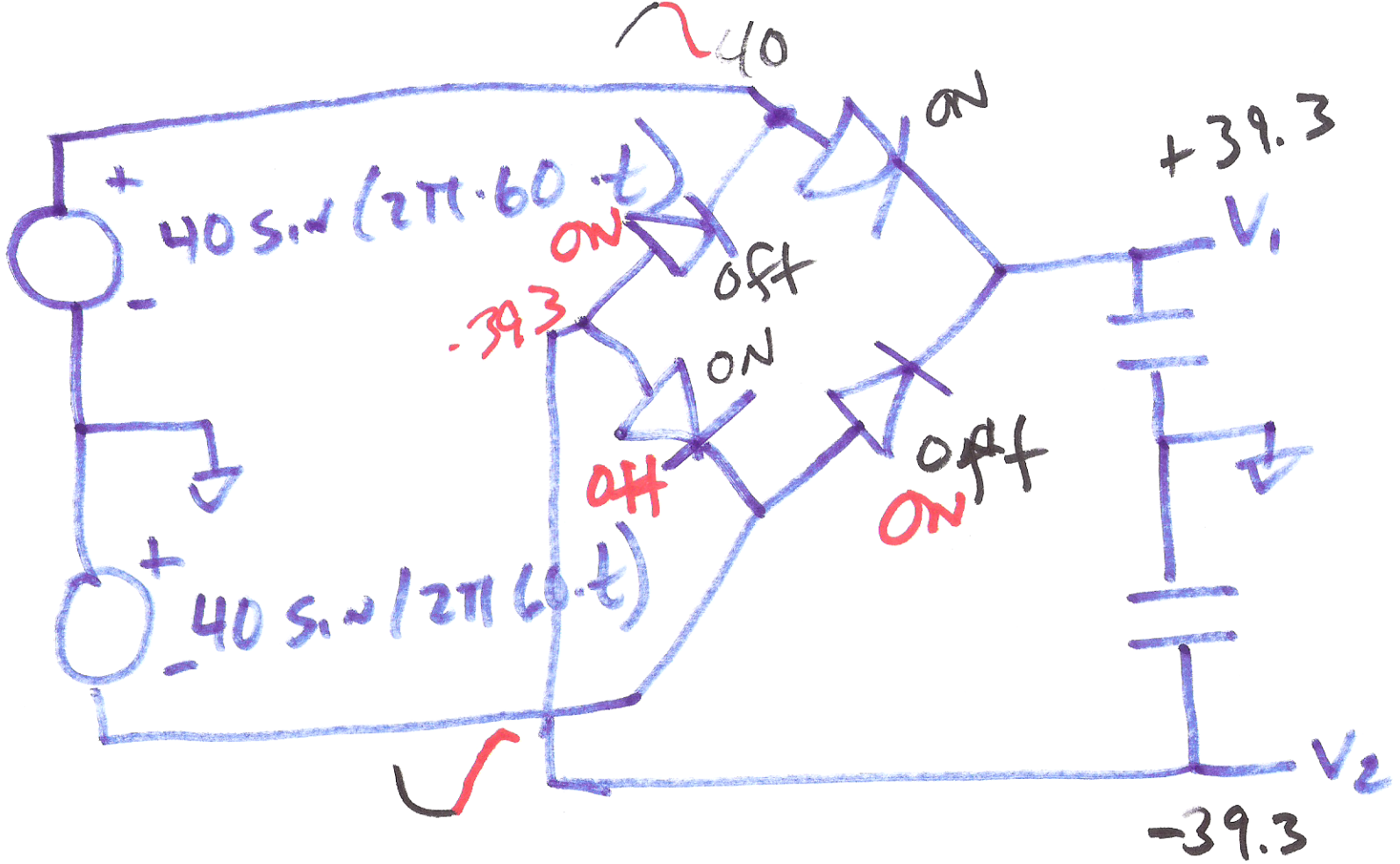
Bridge, 2 diode drops

no center tap XFR

full-wave



3.113


40
ON
+39.3
V1
40 sin(2π·60·t)
ON
off
-39.3
ON
off
off
ON
40 sin(2π60·t)
V2
-39.3