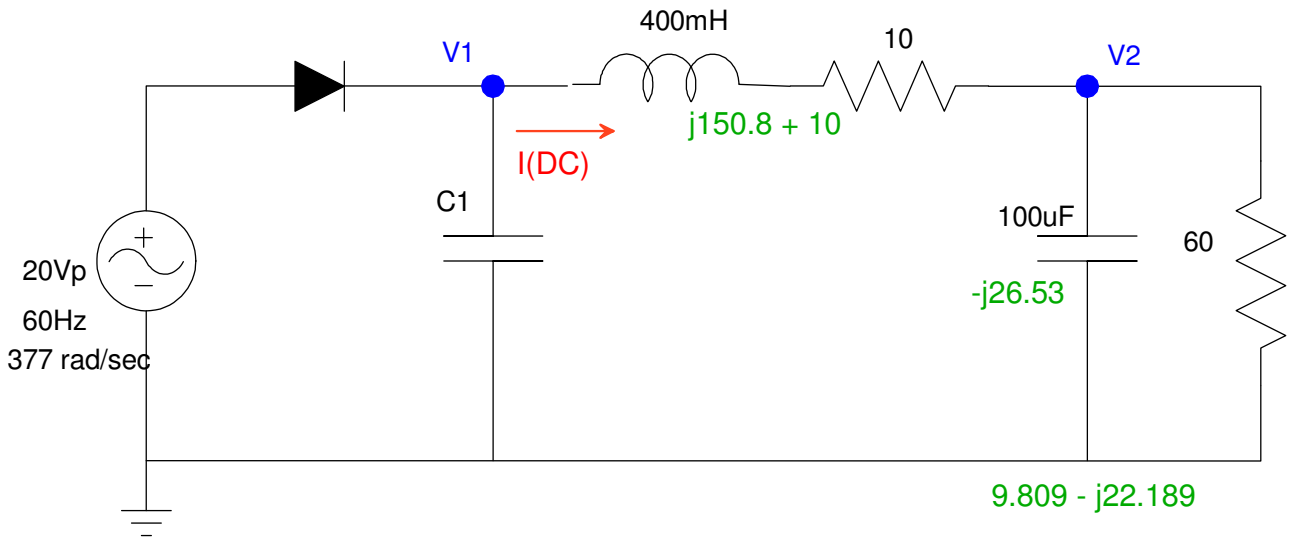
5) Determine the voltages V1 and V2 (both DC and AC). Assume

- Ideal silicon didoes (Vf = 0.7V)
- C1 = (900 + 100*(your birth month) + (your birthday))uF.

C1 (uF) 900 + 100*mo + day	V1		V2	
	DC	AC (V1pp)	DC	AC (V2pp)
1414uF	**17.68V**	**3.250Vpp**	**15.154V**	**0.606Vpp**



$$\max(V_1) = 19.3V$$

$$I \approx \left(\frac{19.3V}{70\Omega}\right) = 275.7mA \qquad \text{worst case}$$

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

$$275.7mA = 1414\mu F \cdot \frac{dV}{1/60s}$$

$$dV = 3.250V_{pp} = V_1(AC)$$

$$V_1(DC) = 19.3V - \frac{1}{2}V_1(AC) = 17.68V$$

$$V_2(DC) = \left(\frac{60}{60+10}\right) V_1(DC) = 15.154V$$

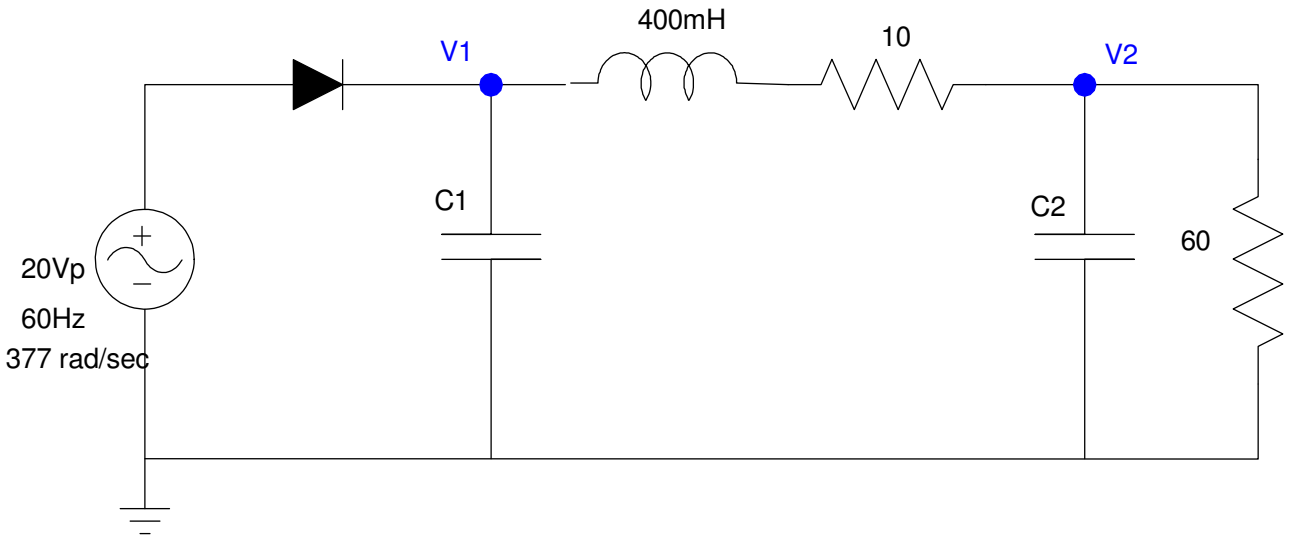
$$V_2(AC) = \left(\frac{(9.809 - j22.189)}{(9.809 - j22.189)+(10+j150.8)}\right) V_1(AC)$$

$$V_2(AC) = 0.606V_{pp}$$

6) Determine C1, and C2 so that

- The ripple at V1 is 4Vpp and
- The ripple at V2 = 500mVpp

C1	C2
1030uF	**127.6uF**



$$V_1(DC) = 19.3V - \tfrac{1}{2} \cdot 4V_{pp} = 17.3V$$

$$I = \left(\frac{17.3V}{70\Omega}\right) = 247mA$$

$$247mA = C_1 \cdot \frac{4V}{1/60s}$$

$$C_1 = 1030\mu F$$

Assume C2 = 0

$$V_2(AC) = \left(\frac{60}{60+(10+j150.8)}\right) 4V_{pp} = 1.444V_{pp}$$

$$\left|\frac{1}{j\omega C_2}\right| = \left(\frac{0.5V_{pp}}{1.444V_{pp}}\right) 60\Omega = 20.782\Omega$$

$$C_2 = 127.6\mu F$$