CpE 111 - Chapter 4 - HW04
4.12, 4.15, 4.17, 4.21, 4.28.

Jesse Lui
9/29/99

4.12 G: $R = 1200\,\Omega$, $V = 0.35V$
F: Power
S: $P = \dfrac{V^2}{R} = \dfrac{(0.35)^2}{1200} = \boxed{1.02 \times 10^{-4}\,W}$ •
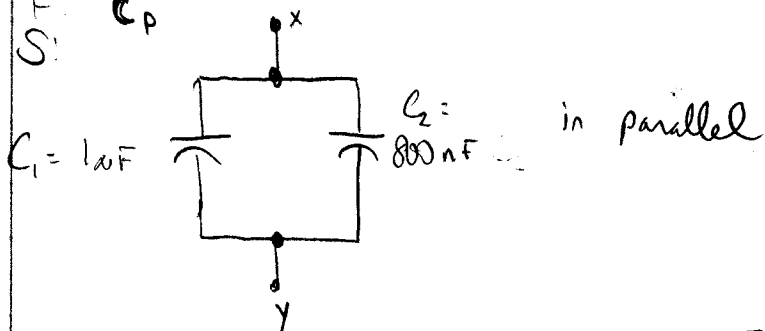
4.15 G: $C = 10\,\mu F$, $V = 2V$
F: Q
S: $C = \dfrac{Q}{V} \Rightarrow Q = CV = (10 \times 10^{-6}F)(2V) = \boxed{20\,\mu C}$

4.17 G: circuit
F: C_P
S:

$C_1 = 1\,\mu F$ $C_2 = 800\,nF$ in parallel

$C_P = C_1 + C_2 = 1 \times 10^{-6} + 800 \times 10^{-9} = \boxed{1.8\,\mu F}$ •

4.21 G: $R = 240\,\Omega$, $\tau = 3\,ns$
F: largest cap
S:

$$\tau = RC \implies C = \frac{\tau}{R} = \frac{3 \times 10^{-9}}{240} = 1.25 \times 10^{-11}\, F$$

$\boxed{12.5\ pF}$ •

4.28. G: signal delay $1.25\,ns$, $n = 1.7$
F: length of signal wavefront lone in cm
S:

$$t_s = \frac{\ell}{V_w} \qquad V_w = \frac{c}{n} = \frac{3.00 \times 10^8}{1.7} = 1.7647 \times 10^8\, m/s$$

$$\ell = t_s V_w = (1.25 \times 10^{-9}\, s)(1.7647 \times 10^8\, m/s) = 0.220588\, m$$

$\boxed{\ell = 22.1\ cm}$ •