You will probably need more paper for your calculations, but problems 3 & 4 require waveform drawings and you may want to hand this sheet in with your drawings.

**EE 1050 / 60 homework # 8 Due: Fri, 9/27/02**

1) Find \( C_{eq} \) in each case

\[ C_1 = 0.2 \mu F \quad C_2 = 0.1 \mu F \]

\[ C_1 = 0.2 \mu F \quad C_2 = 0.1 \mu F \]

\[ C_1 = 1 \mu F \quad C_2 = 3 \mu F \]

\[ C_3 = 1.2 \mu F \quad C_4 = 1.8 \mu F \]

2. Each of the following circuits have been connected as shown for a long time. Find the voltage across each capacitor and the energy stored in each.

a)

\[ R_1 = 330 \Omega \]

\[ V_S = 5.5 \text{ V} \]

\[ R_2 = 220 \Omega \]

b)

\[ R_1 = 2.4 \text{ k}\Omega \]

\[ I_S = 40 \text{ mA} \]

\[ C = 0.47 \mu F \]

c)

\[ R_2 = 4.8 \text{ k}\Omega \]

\[ C_1 = 0.68 \mu F \]

\[ R_1 = 22 \text{ k}\Omega \]

\[ C_2 = 0.22 \mu F \]

\[ R_3 = 10 \text{ k}\Omega \]

\[ V_S = 20 \text{ V} \]
3. The current waveform shown below flows through a 0.025 μF capacitor. Make an accurate drawing of the voltage across it. Label your graph. Assume the initial voltage across the capacitor is 0 V.

4. The voltage across a 2 μF capacitor is shown below. Make an accurate drawing of the capacitor current. Label your graph.

5. The voltage across a 0.68 μF capacitor is \( v_c = 4 \cdot V \cdot \cos\left(200 \cdot t + \frac{\pi}{2}\right) \). Find \( i_c \).

6. The current through a 0.0047 μF capacitor is \( i_c = 20 \cdot \mu A \cdot \cos\left(628 \cdot t - \frac{\pi}{4}\right) \). Find \( v_c \).

7. A capacitor voltage and current are shown at right. What value is the capacitor?

Answers
1. a) 0.3 μF  b) 0.00688 μF  c) 2.5 μF
2. a) 2.2 V 0.012 mJ  b) 60 V 0.846 mJ  c) 13.75 V 0.064 mJ  6.25 V 0.0043 mJ
3. 1.8 V 0.6 V 2.4 V 4. -6 mA 12 mA ramp to -8 mA
4. \( v_c = 6.78 V \cdot \sin\left(628 \cdot t - \frac{\pi}{4}\right) \)
5. \( i_c = -0.544 \cdot \mu A \cdot \cos(200 \cdot t) \)
6. 0.25 μF