

## SECOND MIDTERM

3

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**SHOW ALL WORK!!!!**

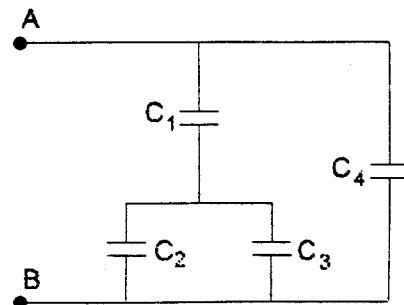
**REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!**

**Use the conversion constants and data given on the front page.**

A battery of 150 V is connected between points A and B.

- +12 (a) Calculate the equivalent capacitance between points A and B.  
 +13 (b) Calculate the charge and potential on capacitor  $C_3$ .

$C_1 = 60.0 \text{ pF}$   
 $C_2 = 45.0 \text{ pF}$   
 $C_3 = 35.0 \text{ pF}$   
 $C_4 = 25.0 \text{ pF}$



$$27) C = C_4 + c' = C_4 + \frac{1}{\frac{1}{C_1} + \frac{1}{C_2 + C_3}} = 59.3 \text{ pF.}$$

b).  $V_1$  correspond to  $C_1$   
 $V_2$  correspond to  $C_{23}$ ,  $C_{23} = C_2 + C_3$

$$\frac{V_1}{V_2} = \frac{C_{23}}{C_1} \Rightarrow \frac{V_1 + V_2}{V_2} = \frac{C_2 + C_3 + C_1}{C_1}$$

$$\Rightarrow \frac{150}{V_2} = \frac{80 + 60}{60}, \text{ so } V_2 = 64.2 \text{ (V)}$$

← (+8)

$$Q = V_2 \cdot C_3 = 2.25 \times 10^{-9} \text{ (C)}$$

← (+5)

without the digit behind the point,  
 minus 1 pt.