Physics-305
Homework Set (1)

This homework set is due on Monday, 16th Dhul-Qi'dah, 1436 (Aug. 31st, 2015) at 10.00 p.m. [slip under my Office (15-3100) door, if needed]

For this homework set in particular, please <u>do not</u> discuss with your colleagues; rather, e-mail me or call me if you need help

Start each question on a <u>new page</u>. Please solve fully and clearly, state assumptions, <u>circle final answers</u>, and comment wisely (when applicable).

Question #1:

Two point charges, $q_1 = + 4 \ \mu C$ and $q_2 = - 2 \ \mu C$, are fixed on the x axis, as shown in **Figure 1**. Which of the following statements regarding the electric field produced by the two charges on the x axis is CORRECT?
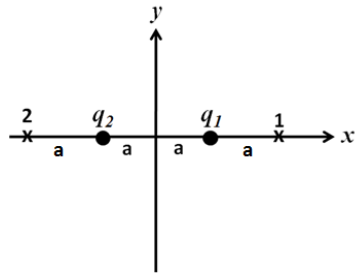

Figure 1

In which direction does the electric field point at point-1, at point-2 and in between?

Question #2:

Two charged particles are fixed in the xy plane as shown in **Figure 2**. Take $q_1 = 10$ nC, $q_2 = -30$ nC, and $a = 1.0$ m. What is the electric potential due to these two particles at the origin?
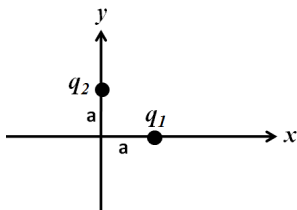
Figure 2
Question #3:

A certain resistor dissipates 0.50 W when connected to a 3.0-V potential difference. How much will the same resistor dissipate when connected to a 1.0-V potential difference?

Question #4:

In order to store a total of 0.040 J of energy in the two identical capacitors shown in **Figure 3**. What should the capacitance (**C**) be?
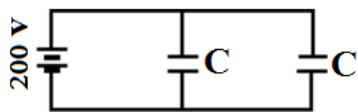

Figure 3

Question #5:

A 10-Ω resistor has a constant current passing through it. If 1200 C of charge flow through it in 4.0 minutes, what is the potential difference across the resistor?

Question #6:

Resistor 1 has twice the resistance of resistor 2. They are connected in parallel to a battery. If the power dissipated in R_1 is P_1 and the power dissipated in R_2 is P_2, what is P_1/P_2 ?

Question #7:
Find the current in 8.00-Ω resistor in the circuit shown in **Figure 4**?

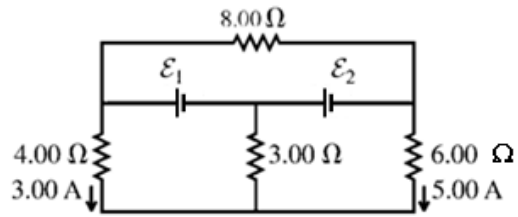**Figure 4**

Question #8:

The capacitor shown in **Figure 5** is initially charged. Switch S is closed at time $t = 0$. At the end of 10.0 ms, the charge on the capacitor is one third the initial value. If the resistor R = 910 ohm, what must the capacitance be?
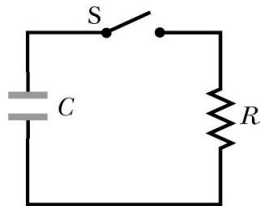

Figure 5