Chapter 16 HW: Electric Forces and Fields

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| Topic | Section | Page | Problem #’s |
| Coulomb’s Law | Practice A | 566 | 1, 3 |
| The Superposition Principle | Practice B | 568 | 1 |
| Equilibrium ::optional:: | Practice C | 570 | 1\*, 3\* |
| Electric Field Strength | Practice D | 575 | 1\*, 3 |
| Chapter Review | Ch. Review | 581 | 1-31 odds  (19, 21, 23 are optional) |

Each practice problem must at least be attempted in order to take a test retake. If 100% are attempted, only 80% of the items must be completed to qualify for a retake. Approximate percent completion will be recorded on test day in a 1-10 score that estimates fractional completion to the nearest 10%.

Answers to the selected problems are in the back of the book, starting on page 942. Solutions may be available upon request, and will most frequently be posted online when available.

‘Section Review’ questions are not included because there are no answers for these in the back of the book. It is not because the questions are of lesser value. Often times the narrative style of some of these questions is a good way to check your own understanding of the content.

‘Mixed Review’ questions are not included because they are a more challenging extension of the skills acquired in the chapter. The answers to these problems (odds) are in the back of the book, but the nature of these questions is more for extension than the practicing and deepening of critical skills.

**Static Electricity**

1. I can explain how objects have an electric charge based on the gain or loss of electrons.
2. I can recognize that electric charge is a conservable quantity.
3. I can explain the methods of charging objects.
   1. Friction
   2. Conduction
   3. Induction
4. I can explain how charges will evenly distribute themselves over the surface of a conductor compared with the lack of distribution in insulators.
5. I can use Coulomb’s Law to mathematically describe how the electric force is directly proportional to the size of the relative charges and inversely proportional to the squared distance between the charged objects.
   1. For two charges.
   2. For more than two charges in a straight line.
6. I can contrast electrical and gravitational field forces.
   1. Relative strength
   2. Attractive and/or repulsive nature

**Electric Fields and Electric Potential Energy**

1. I can mathematically calculate the electric field strength surrounding a charged object at a certain location.
2. I can qualitatively describe the electric field as the amount of electric force per unit charge.
   1. I can use the superposition principle to explain how an electric field is caused by the sum of the individual charges.
   2. I can recognize that the direction of the electric field is parallel to the direction of the electrical force on a positively charge object at that location.
   3. I can recognize that the electric field is existent even if nothing is interacting with it.
   4. I can plot field arrows to represent an electric field.
      1. Dipoles
      2. Two point charges
      3. Parallel capacitor plates
3. I can explain the concepts of electric potential energy.
   1. I can describe how multiple charges in close proximity are needed to have the potential to do work.
   2. I can describe that the potential energy in the system of charges can be converted to the kinetic energy of the charges.
4. I can describe potential difference (𝛥V) for a test charge within a static electric field based on the difference in electric potential energy per unit charge.