Student #: _____ Student Name: _____

AP Physics Class 10 & 11: Electrostatics & Gauss's Law

The questions in this homework assignment cover AP 1 and C exams. Some of the questions are not typically questions.

_____ 1. Two electric objects experience a repulsive force. What happens to that force if the distance between the objects is doubled?

(a) It decreases to one-fourth its value.
(b) It decreases to one-half its value.
(c) It stays the same.
(d) It doubles.
(e) It quadruples.

_____ 2. A pith ball is a tiny piece of Styrofoam that is covered with a conductive paint. One pith ball initially has a charge of 6.4×10^{-8} C, and it touches an identical, neutral pith ball. After the pith balls are separated, what is the charge on the pith ball that had the initial charge?

(a) 6.4×10^{-8} C
(b) 3.2×10^{-8} C
(c) 0 C
(d) -3.2×10^{-8} C
(e) -6.4×10^{-8} C

_____ 3. Glass becomes positively charged when it is rubbed with silk. Which of the following is the best description of whats happening?

(a) Electrons are rubbed off the glass onto the silk.
(b) Electrons are rubbed off the silk onto the glass.
(c) Protons are rubbed off the glass onto the silk.
(d) Protons are rubbed off the silk onto the glass.
(e) Neutrons in the glass have an affinity for positive charge.

_____ 4. Consider an isolated, neutral system consisting of wool fabric and a rubber rod. If the rubber rod is rubbed with wool to become negatively charged, what can be said about the wool fabric?

(a) It becomes equally negatively charged.
(b) It becomes equally positively charged.
(c) It becomes negatively charged but not equally.
(d) It becomes positively charged but not equally.
(e) In a neutral system, neither object can become charged.

_____ 5. An electron and a proton are separated by 1.50×10^{-10} m. If they are released, which one will accelerate at a greater rate, and what is the magnitude of that acceleration?

(a) The electron; 1.12×10^{22} m/s^2
(b) The proton; 1.12×10^{22} m/s^2
(c) The electron; 6.13×10^{18} m/s^2
(d) The proton; 6.13×10^{18} m/s^2
(e) They both accelerate at the same rate; 1.02×10^{-8} m/s^2

Free-Response Questions:

1. A charged spherical shell