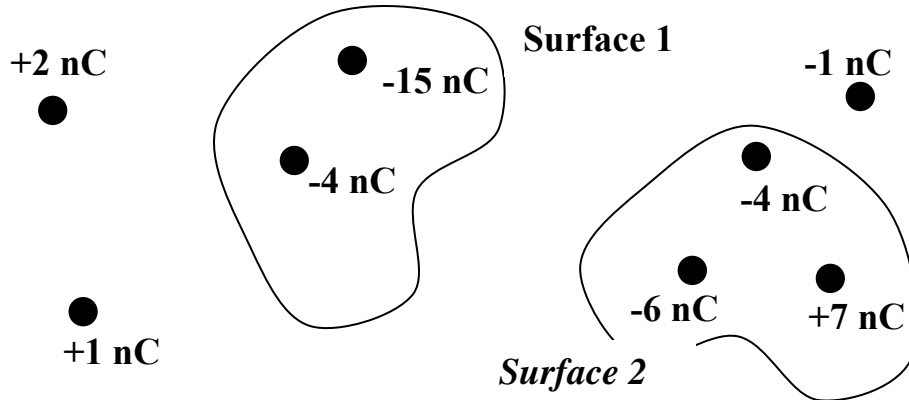


Physics 2212
Homework 3 (due: February 26)

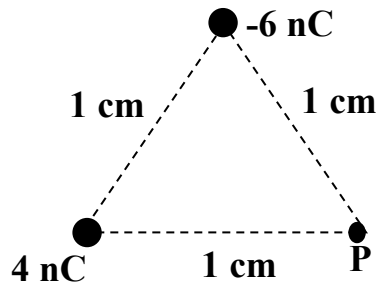
1. What is the electric flux through (a) surface 1; (b) surface 2?



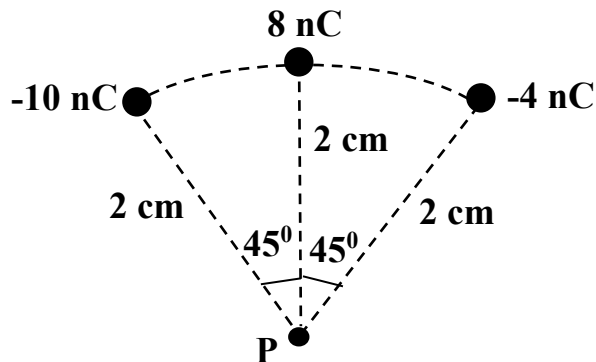
2. An initially neutral conductor contains a hollow cavity in which there is a -50 nC point charge. A charged rod transfer -200 nC to the conductor. Afterward, what is the charge (a) on the inner wall of the cavity wall; (b) on the external surface of the conductor?

3. The electric flux through each face of a $2.0 \text{ m} \times 2.0 \text{ m} \times 2.0 \text{ m}$ cube is $500 \text{ N m}^2/\text{C}$. How much charge is inside the cube?

4. What is the electric potential at point P?

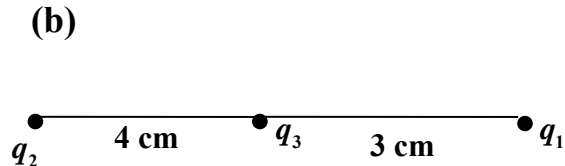
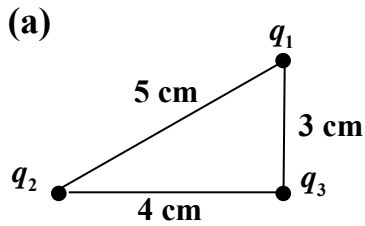


5. What is the electric potential at point P?



6. The potential at the center of a 4.0-cm-diameter copper sphere is 500 V, relative to $V=0$ V at infinity. How much excess charge is on the sphere?

7. Find potential energy for two configurations (a) and (b) shown in Fig. Three particles have the following charges $q_1 = 1\mu\text{C}$, $q_2 = 5\mu\text{C}$, $q_3 = -5\mu\text{C}$. Which configuration has the lower energy?



8. Point charge $q = 12\mu\text{C}$ is placed at the center of insulating uniformly charged sphere of radius $R = 50\text{cm}$ and total charge $Q = -16\mu\text{C}$. Find electric potential at distance $r = 20\text{cm}$ from the center of the sphere, assuming that electric potential is 0 very far from the sphere.

9. Point charge q is placed at the center of insulating uniformly charged sphere of radius $R=20\text{cm}$ and total charge $Q=5\mu\text{C}$. The electric potential at distance $r = 10\text{cm}$ from the center of the sphere is 0. What is the value of the charge q ?

10. Four particles with charges $q = 1\mu\text{C}$, $q = 1\mu\text{C}$, $q = 1\mu\text{C}$, and $Q = 5\mu\text{C}$ are placed at the vertices of a square of side $a = 20\text{cm}$. The particle with charge Q and mass $m = 100\text{g}$ is released from the rest. How fast will this particle be moving when it will be at infinite distance from the other particles.

