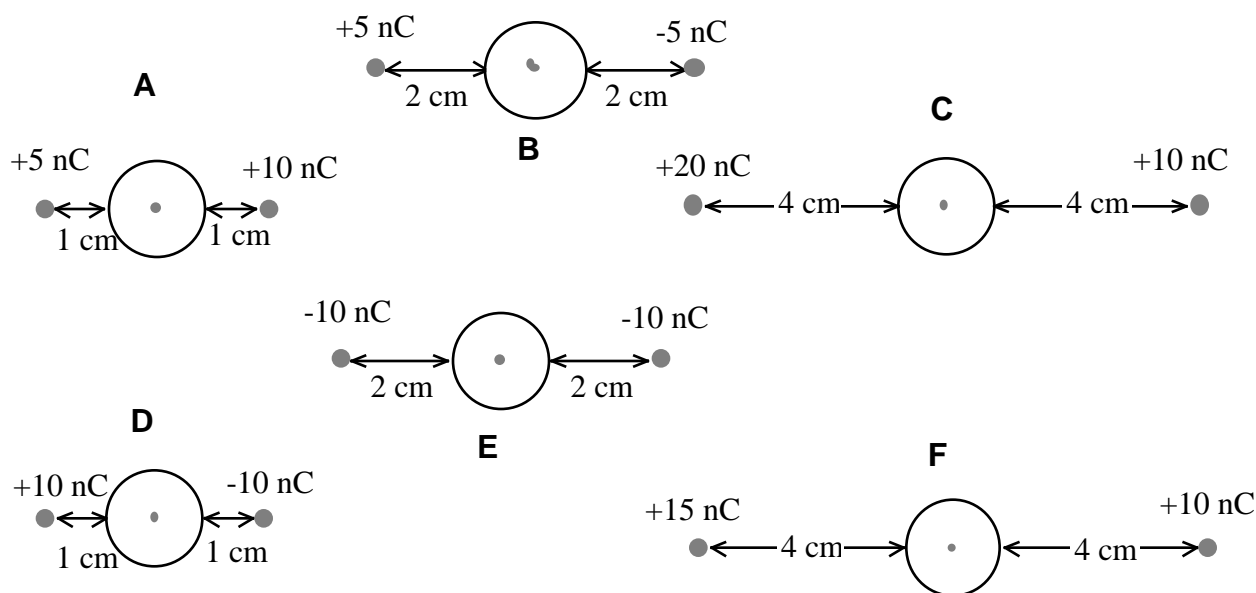


Charges Outside a Conducting Sphere—Force on Enclosed Charge ¹³³

Shown below are six hollow spheres made of an electrically conducting material such as copper. At the center of each sphere is a charge q , which is the same sign and magnitude for all six cases. Outside these spheres, at various distances, are electric charges of various magnitudes. Given in each figure is the magnitude of the outside charges, as well as the distance between that charge and the sphere. Each figure is independent of the others (they do not affect each other).

Rank these situations, from greatest to least, on the basis of the magnitude of the force on the charge at the center of the sphere. That is, put first the situation where the charge at the center of the sphere experiences the strongest force, and put last the situation where the charge in the center experiences the weakest force.



Greatest 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ Least

Or, the magnitude of the electric force on the center charge is the same for these cases. _____

Or, the magnitude of the electric force on the center charge is zero for these cases. _____

Please carefully explain your reasoning.

How sure were you of your ranking? (circle one)

Basically Guessed

Sure

Very Sure

1 2 3 4 5 6 7 8 9 10

¹³³ C. Hieggelke, D. Maloney, T. O’Kuma