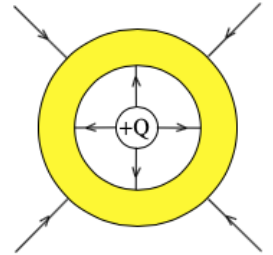


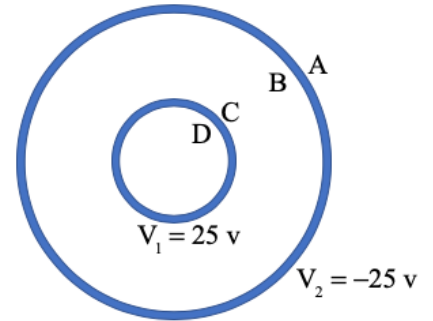
Note: Some of this question came from (or was inspired by) the “Frenley Physics” YouTube site:

A hollow, conducting, spherical shell has a charged sphere $+Q$ at its center. The electric field lines for the system are shown.



- a.) What is the net charge on the conducting spherical shell? Justify.
- b.) Is the magnitude of the net charge on the conducting spherical shell small, equal to or greater than Q ? Justify.
- c.) A student argues that the conducting sphere is an insulator. What would have to be true for that assertion to be true. Explain.

d.) New situation: The set-up is replaced by two, concentric, spherical conducting shells. The outside shell has a voltage, relative to infinity, of -25 volts, and the inner shell has a voltage of +25 volts. A point just outside the outer shell is identified as Point A, just inside the outer shell as Point B, a point just outside the inner shell as Point C and a point just inside the inner shell as Point D.



i.) What are the charges on the shells? Justify.

ii.) Which charge magnitude is larger?

iii.) Rate the electric field magnitudes in order of smallest to largest, justifying each choice.