

3. REVIEW QUESTIONS

1. Discuss point charges and volume charge distributions. Under what conditions may a charge distribution be considered a point charge?
2. Under what conditions may a charge distribution be considered a line charge distribution? Discuss the units involved and give examples.
3. Under what conditions may a charge distribution be considered a surface charge distribution? Discuss the units involved and give examples.
4. Can there also be combinations of charge distributions? Give examples.
5. State Coulomb's law. Compare this law with the gravitational law.
6. Like charges repel each other, unlike charges attract. How is this property stated in Coulomb's law?
7. Discuss electrostatic forces in the atom. What prevents electrons from fusing into the nucleus?
8. Give a simple physical definition of the electric field in terms of forces and charges.
9. The electric field (mark all that are true):
 - (a) Starts at a positive charge and ends in a negative charge.
 - (b) Is not a physical quantity.
 - (c) Is the force per unit charge produced by a charge or charge distribution.
 - (d) Is physically measurable.
 - (e) Shows the direction of force on a negative point charge.
 - (f) Shows the direction of force on a positive point charge.
10. The electric field intensity of a point charge can be infinite. Where does this occur and what is the physical meaning of this?
11. Contemplate on the uses of static electric fields. Can you list additional applications not mentioned in this chapter?
12. The electric field of a positive point charge or charge distribution is identical in all respects to the electric field of a negative charge or charge distribution except for direction in space T/F .
13. Define the idea of the electric flux. To what does it correspond? Why is it convenient to define?
14. Electrostatic fields have many applications, but most are "low-power" applications; that is, relatively low forces are involved. Explain why this is so.
15. In contrast, consider lightning (will be discussed in Chapter 4). Is this a "low-power" phenomenon? Explain.
16. When your dog pulls on its leash, what type of force prevents the leash from breaking? Explain.
17. Friction causes charging. What is the mechanism that causes this to happen and where does the energy required to do so comes from?
18. Suppose we discovered that the charge of the electron were not quantized; that is, that the charge of the electron is not fixed. Speculate on the consequences of this "discovery."

- 19.** Compare gravitational and electrostatic forces between two electrons at atomic distances assuming their mass is the rest mass.