Write numbers 1 to 6 in your notebook. Indicate beside each number whether the corresponding statement is true (T) or false (F). If it is false, write a corrected version.

1. If a charge q exerts a force of attraction of magnitude F on a charge $-2q$, then the charge $-2q$ exerts a force of attraction of magnitude $2F$ on the charge q.
2. The only difference between electric and gravitational forces is that the electric force is larger.
3. The electric field at the surface of a conductor in static equilibrium is perpendicular to the surface of the conductor.
4. Electric field lines indicate the path that charged particles will follow near another charged object.
5. It is safe to stay in your car during a lightning storm because the tires act as insulators.
6. The acceleration experienced by two small charges as they start from rest and move apart is inversely proportional to the square of the distance between them.

Write numbers 7 to 13 in your notebook. Beside each number, write the letter corresponding to the best choice.

7. When comparing the force of attraction between an electron and a proton due to the electric force and gravity, it can be concluded that
   (a) the gravitational force is a lot stronger
   (b) the electric force is a lot stronger
   (c) the two types of forces are the same
   (d) they cannot be compared
   (e) the electric force is slightly stronger
8. The electric force on each of two small charged spheres due to the other sphere has a magnitude of F. The charge on one sphere is doubled, and the distance between the centres of the spheres is tripled. The magnitude of the force on each small charged sphere is
   (a) $2F$ (c) $\frac{2F}{3}$ (e) $\frac{2F}{9}$
   (b) $\frac{F}{3}$ (d) $\frac{F}{9}$
9. The magnitude of the electric field due to a small charged object is 12 N/C at a distance of 3.0 m from the charge. The field 6.0 m away from the charge is
   (a) 36 N/C (c) 6.0 N/C (e) 3.0 N/C
   (b) 12 N/C (d) 4.0 N/C
10. Which diagram in **Figure 1** represents the net electric field between two charged parallel plates if a neutral conducting sphere is placed between the plates?
    (a) (b) (c) (d) (e) none of these

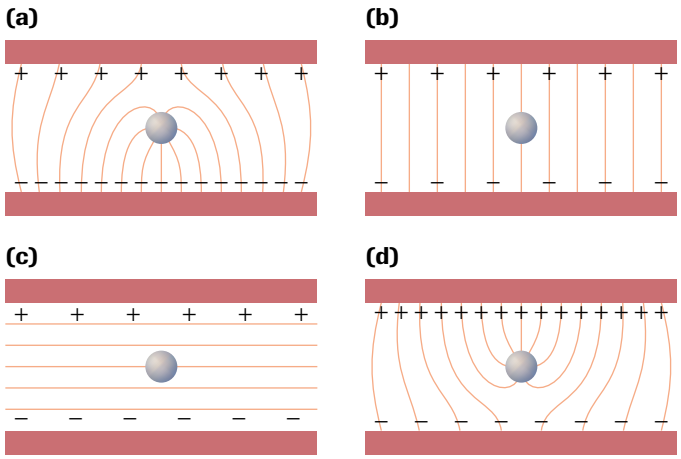

Figure 1

11. A neutral charged conductor is placed near a positively charged object. The electric field inside the neutral conductor is
    (a) perpendicular to the surface
    (b) zero
    (c) directed toward the negative charge
    (d) stronger than the electric field at the surface of the conductor
    (e) none of these
12. A mass has a charge on it. Another small mass with a positive charge is moved away from the first mass, which remains at rest. As the distance increases, what happens to the gravitational potential energy E_g and the electric potential energy E_E?
    (a) E_g decreases and E_E decreases
    (b) E_E either decreases or increases, depending on the unknown sign of charge, and E_g decreases
    (c) E_g decreases and E_E increases
    (d) E_E decreases or increases, depending on the unknown sign of charge, and E_g increases
    (e) E_g increases and E_E decreases
13. Two isolated electrons starting from rest move apart. Which of the following statements is true as the distance between the electrons increases?
    (a) The velocity increases and the acceleration is constant.
    (b) The velocity increases and the acceleration decreases.
    (c) The velocity decreases and the acceleration is constant.
    (d) The velocity increases and the acceleration increases.
    (e) The velocity is constant and the acceleration is constant.

An interactive version of the quiz is available online.
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