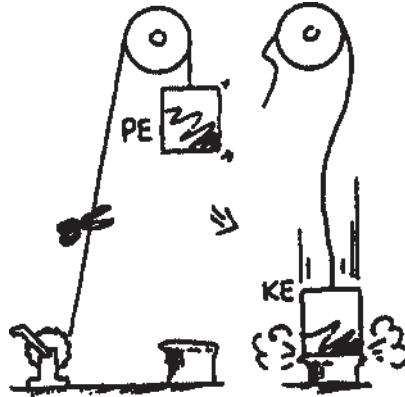


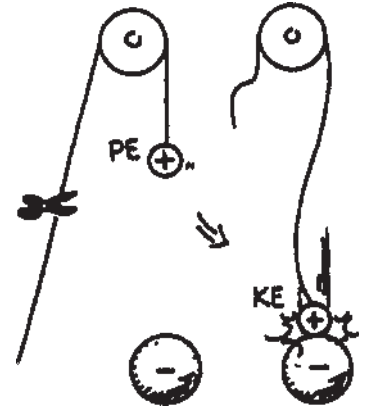
**Concept-Development Practice Page 33-2**

**Electric Potential**

1.



Just as PE (potential energy) transforms to KE (kinetic energy) for a mass lifted against the gravitational field (left), the electric PE of an electric charge transforms to other forms of energy when it changes location in an electric field (right). When released, how does the KE acquired by each compare to the decrease in PE?



2. Complete the statements.



A force compresses the spring. The work done in compression is the product of the average force and the distance moved.  $W = Fd$ . This work increases the PE of the spring.

Similarly, a force pushes the charge (call it a test charge) closer to the charged sphere. The work done in moving the test charge is the product of the average \_\_\_\_\_ and the \_\_\_\_\_ moved.  $W = \text{_____}$ . This work \_\_\_\_\_ the PE of the test charge.

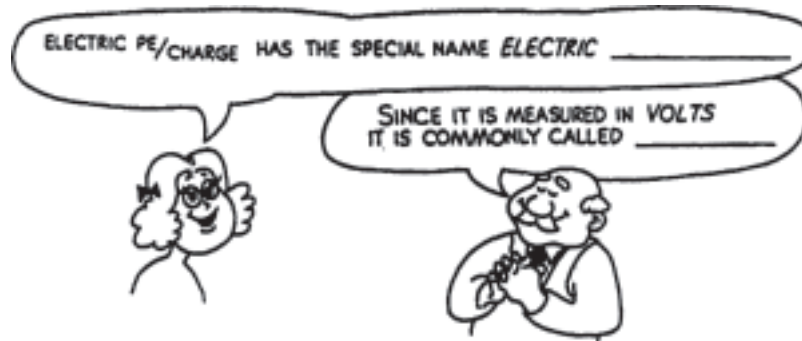


If the test charge is released, it will be repelled and fly past the starting point. Its gain in KE at this point is \_\_\_\_\_ to its decrease in PE.

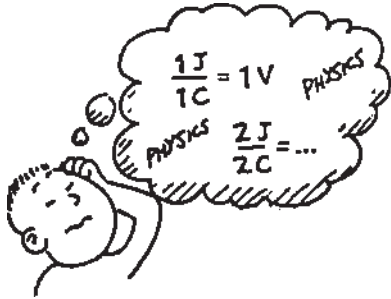
At any point, a greater quantity of test charge means a greater amount of PE, but not a greater amount of PE *per quantity* of charge. The quantities of PE (measured in joules) and PE/charge (measured in volts) are different concepts.

By definition: **Electric Potential = PE/charge**. 1 volt = 1 joule/1 coulomb

3. Complete the statements.



**CONCEPTUAL PHYSICS**



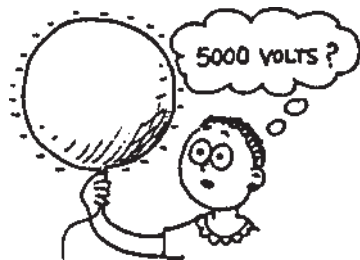
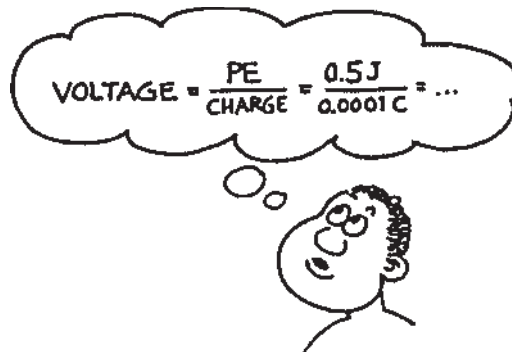
4. When a charge of 1 C has an electric PE of 1 J, it has an electric potential of 1 V. When a charge of 2 C has an electric PE of 2 J, its potential is \_\_\_\_\_ V.

5. If a conductor connected to the terminal of a battery has a potential of 12 volts, then each coulomb of charge on the conductor has a PE of \_\_\_\_\_ J.

6. If a charge of 1 C has a PE of 5000 J, its voltage is \_\_\_\_\_ V.

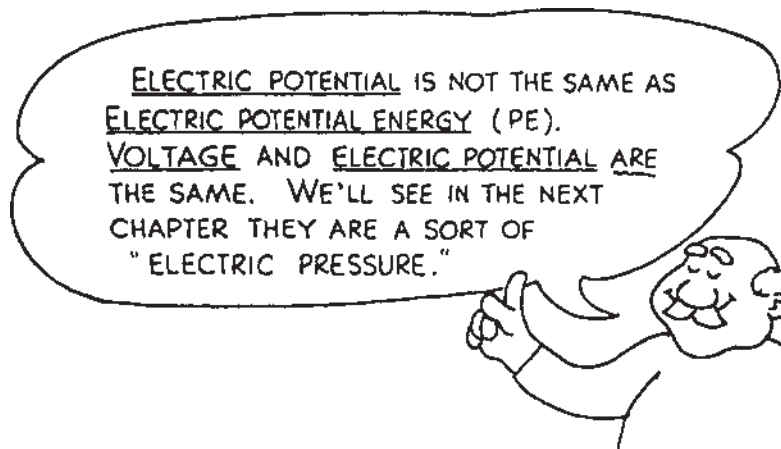
7. If a charge of 0.001 C has a PE of 5 J, its voltage is \_\_\_\_\_ V.

8. If a charge of 0.0001 C has a PE of 0.5 J, its voltage is \_\_\_\_\_ V.



9. If a rubber balloon is charged to 5000 V, and the quantity of charge on the balloon is 1 millionth coulomb, (0.000001 C) then the PE of this charge is only \_\_\_\_\_ J.

10. Some people get mixed up between force and pressure. Recall that pressure is force *per area*. Similarly, some people get mixed up between electric PE and voltage. According to this chapter, voltage is electric PE *per* \_\_\_\_\_.



**CONCEPTUAL PHYSICS**