Electrostatics: You’ll get a real charge out of this! Get it?... Charge!?

1. Consider the following charge distribution:

N

1.1mm

2.8 C

-1.6 C

4.6mm

A

B

W

E

S

 a. What is VA?

 b. What is VB?

 c. How much work would it take to move a proton from A to B?

 d. How much work would it take to move an electron from A to B?

 e. What is the electric field at A?

 f. What is the electric field at B?

 g. What would be the force on a +2.0x10-12C charge at A?

 h. What would be the force on a -4.0x10-12C charge at A?

 i. How much work would it take to move a proton from A to infinity?

 j. How much work would it take to move a proton from infinity to A?

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 i. How much work would it take to move a proton from A to infinity?

 j. How much work would it take to move a proton from infinity to A?

2. How much time would it take for a proton to accelerate from rest to 3.0x107m/s (10% the speed of light) in a region where the potential changes by 120V for every 1.00cm of motion?

3. An electron is orbiting the nucleus in a hydrogen atom. The approximate radius of the orbit is 5.0x10-11m. What is the speed of the electron?

4. A proton at rest is 10.0cm from a fixed -6.0x10-8C charge. The proton is released. What is its speed when it is 2.00cm from the charge?

5. The energy of two point charges is -3.00x10-16J. What is the **change in energy** of these two point charges if the distance between is quadrupled?

6. The energy of two point charges is -3.00x10-16J. When released will the charges naturally move towards each-other or away from each other?

7. Two point charges have 5.6x10-12J of electrical potential energy when separated by d, both at rest. The charges are released. Find their kinetic energy when separated by 3d.

8. What is the potential at the surface of a conducting sphere with a radius of 16cm carrying 2.4x1012 excess electrons? What is the potential at the centre of said sphere?

9. A proton is released from rest 14.0cm from a fixed +16nC charge. How far from the charge will it be when it is moving at 4.2x106m/s?

10. A proton is released from rest 14.0cm from a fixed -16nC charge. How far from the charge will it be when it is moving at 4.2x106m/s?

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