Special Problems

Honors Physics – Week 5

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Honors Physics P222 - Spring, 2004

Problem 5.1

Imagine an infinite line of charges each separated from its nearest neighbor by distance a. The charges all have the same magnitude e and alternate in sign. Pick any charge. What is its potential energy in the field of all the other charges?

Problem 5.2

Three protons and three electrons are to be placed at the vertices of a regular octahedron the edges of which are of length a. What is the energy of the system? There are two possible arrangements. Calculate the energy of each.

Problem 5.3

Find a geometrical arrangement of one proton and two electrons such that the potential energy of the system is zero. How many arrangements are there with the three particles on the same straight line?

Note that these problems can be found in *Electricity and Magnetism* by E. M. Purcell – 2nd edition. This is volume 2 of the Berkely Physics Course.