# Quiz 2

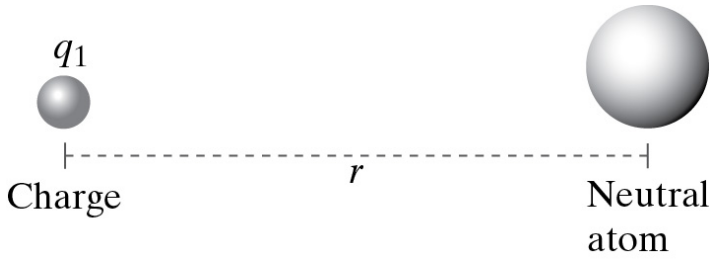
You may or may not make use of the following:

$\epsilon_0 = 8.85 \times 10^{-12}\ Nm^2C^{-2} \quad k = \frac{1}{4\pi\epsilon_0} = 9 \times 10^9\ C^2N^{-1}m^{-2}$

$|\vec{E}_{\text{dipole,on-axis}}| \approx \frac{1}{4\pi\epsilon_0}\frac{2p}{r^3} \qquad |\vec{E}_{\text{dipole,perp}}| \approx \frac{1}{4\pi\epsilon_0}\frac{p}{r^3}$

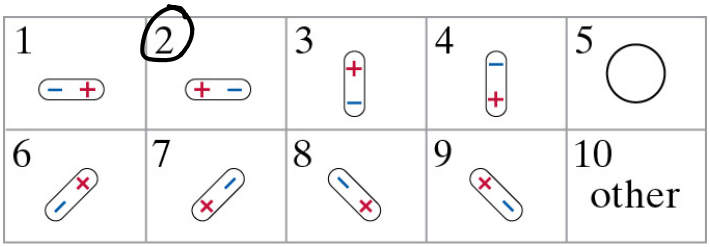
1. Which of the following are true? Check ALL that apply.

   ☐ If the net electric field at a particular location inside a piece of metal is zero, the metal is not in equilibrium
   ☐ The net electric field inside a block of metal is zero under all circumstances
   ☑ The net electric field at any location inside a block of copper is zero if the copper block is in equilibrium
   ☐ The electric field from an external charge cannot penetrate to the center of a block of iron
   ☐ In equilibrium, there is a net flow of mobile charges inside a conductor




2. Consider the diagram above, where $q_1$ is a charged particle and the atom is neutral.

   (a) If $q_1$ is negative in the above diagram, which of the configurations below (1-10) best describes the charge distribution in the neutral atom in this situation? If other, please specify.




   (b) Which arrow below best describes the direction of the electric field at the location of $q_1$ due to the polarized neutral atom?

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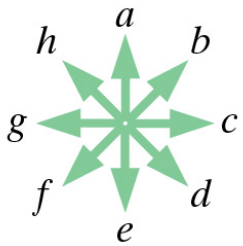


*j* zero magnitude

   (c) Which of the arrows best describes the direction of the force on the charged particle, due to the polarized atom?

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