Base your answers to questions **1** through **3** on the information and diagram below.

Two small charged spheres, *A* and *B*, are separated by a distance of 0.50 meter. The charge on sphere A is $+2.4 \times 10^{-6}$ coulomb and the charge on sphere B is -2.4×10^{-6} coulomb.

A   B

(Graph: vertical axis labeled "Magnitude of Electrostatic Force" starting at 0, horizontal axis labeled "Distance of Separation")
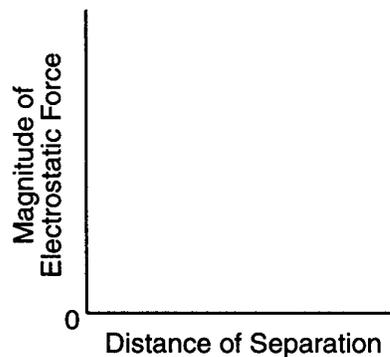
1. Using the axes above, sketch the general shape of the graph that shows the relationship between the magnitude of the electrostatic force between the two charged spheres and the distance separating them. The charge on each sphere remains constant as the distance separating them is varied.

2. Calculate the magnitude of the electrostatic force that sphere *A* exerts on sphere *B*. [Show all calculations, including the equation and substitution with units.]

3. On the diagram, sketch three electric field lines to represent the electric field in the region between sphere *A* and sphere *B*. [Draw an arrowhead on each field line to show the proper direction.]

Base your answers to questions **4** and **5** on the information and diagram below.

Two parallel plates separated by a distance of 2.0×10^{-2} meter are charged to a potential difference of 1.0×10^{2} volts. Points A, B, and C are located in the region between the plates.
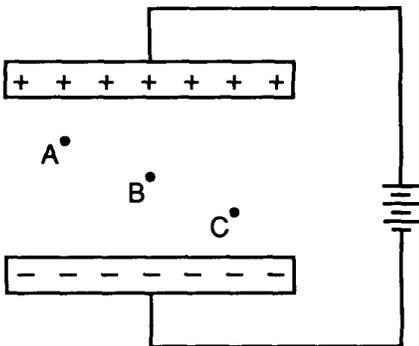

4. Calculate the magnitude of the electric field strength between the plates. [Show all calculations, including the equation and substitutions with units.]

5. On the diagram, sketch the electric field lines between the oppositely charged parallel plates through points A, B, and C. [Draw lines with arrowheads in the proper direction.]

Base your answers to questions **6** and **7** on the following information.

The magnitude of the electric field strength between two oppositely charged parallel metal plates is 2.0×10^3 newtons per coulomb. Point P is located midway between the plates.

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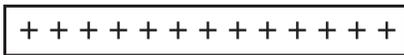
•P

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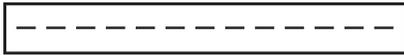
6. An electron is located at point P between the plates. Calculate the magnitude of the force exerted on the electron by the electric field. [Show all work, including the equation and substitution with units.]

7. On the diagram above, sketch *at least five* electric field lines to represent the field between the two oppositely charged plates. [Draw an arrowhead on each field line to show the proper direction.]