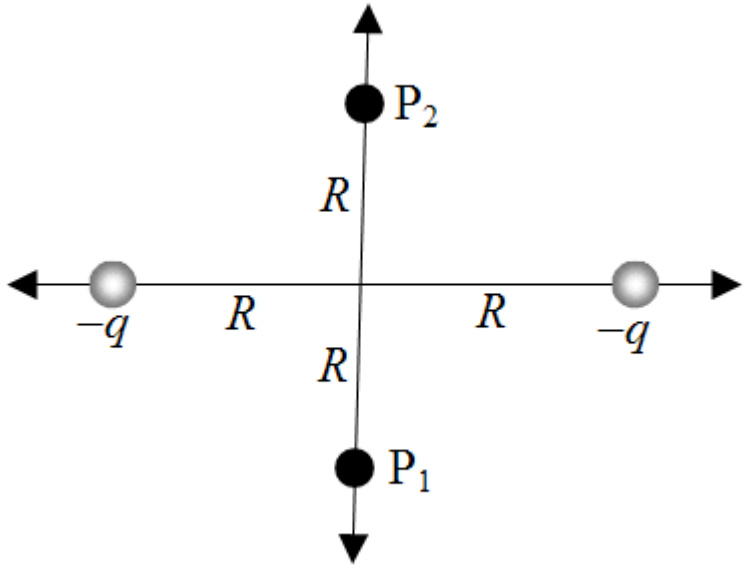
Halliday/Resnick/Walker
Fundamentals of Physics

Classroom Response System Questions

Chapter 22 Electric Fields

Interactive Lecture Questions

22.4.1. Two negatively-charged objects are located on the *x* axis, equally distant from the origin as shown. Consider the electric field at the point P_1. How will that electric field change if a third object with a charge $+q$ is placed at point P_2? Note: the point P_2 is the same distance from the origin as the point P_1 and the magnitude of each of the charges is the same.



a) The magnitude of the electric field will decrease by 25%.

b) The magnitude of the electric field will increase by 25%.

c) The magnitude of the electric field will decrease by 50%.

d) The magnitude of the electric field will increase by 50%.

e) The magnitude of the electric field will increase by 100%.

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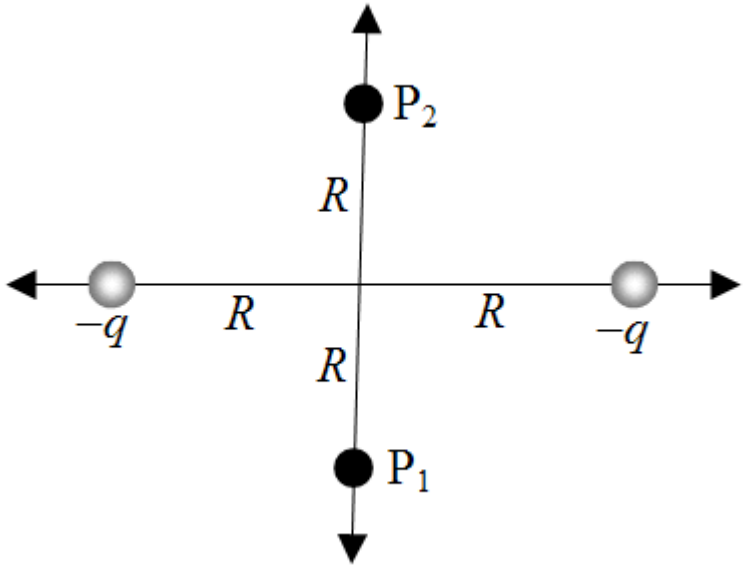


d) The magnitude of the electric field will increase by 50%.

e) The magnitude of the electric field will increase by 100%.

22.4.2. The drawing shows a hollow conducting sphere with a net positive charge uniformly distributed over its surface. A small negatively-charged object has been brought near the sphere as shown. What is the direction of the electric field at the center of the sphere?

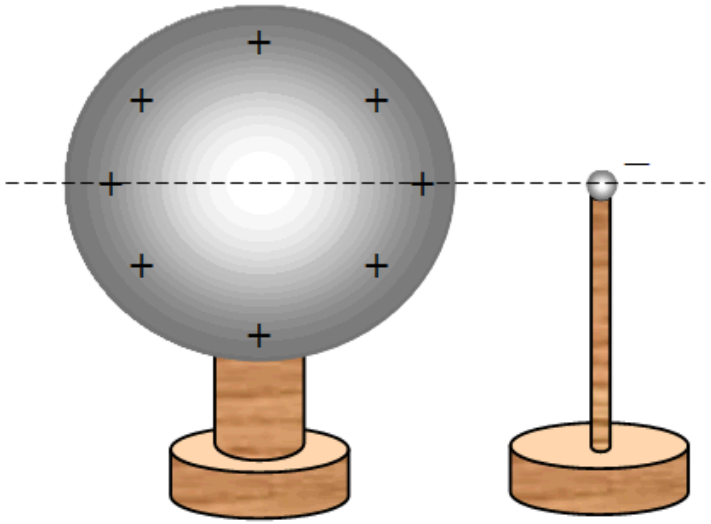
a) There is no electric field at the center of the sphere.

b) to the left

c) to the right

d) upward

e) downward



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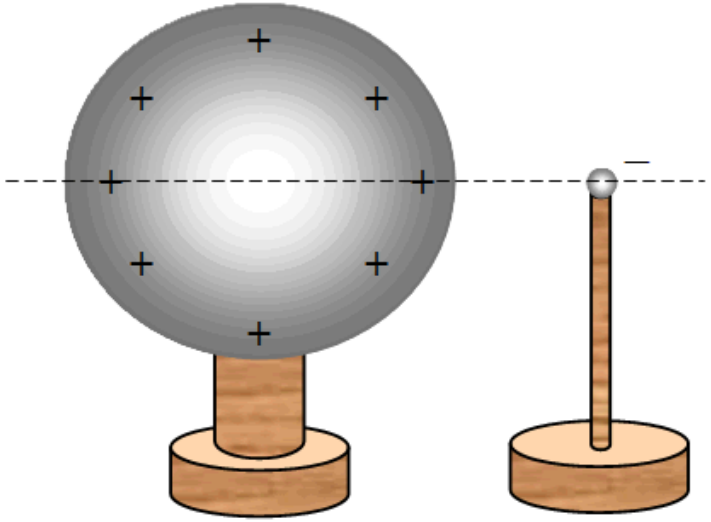


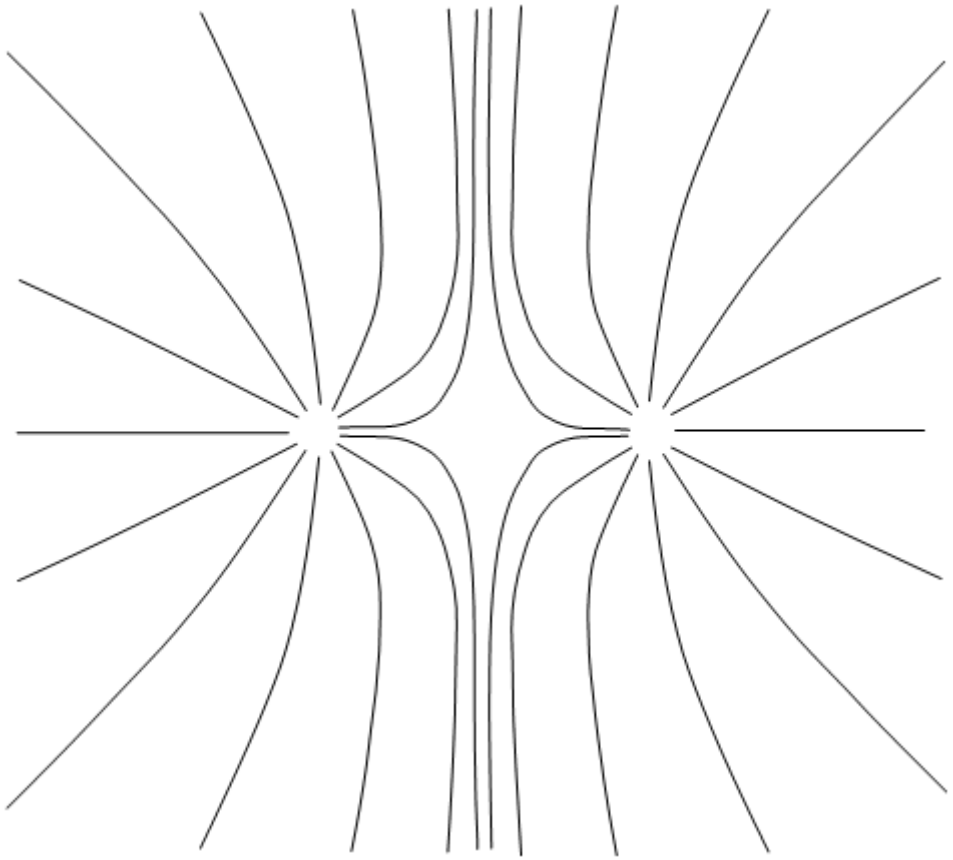
22.4.4. Consider the electric field lines shown in the drawing. Which of the following statements correctly describes this situation?

a) The electric field is due to a positively charged particle.

b) The electric field is due to a negatively charged particle.

c) The electric field is due to a positively charged particle and a negatively charged particle.

d) The electric field is due to particles that are both charged either positively or negatively.



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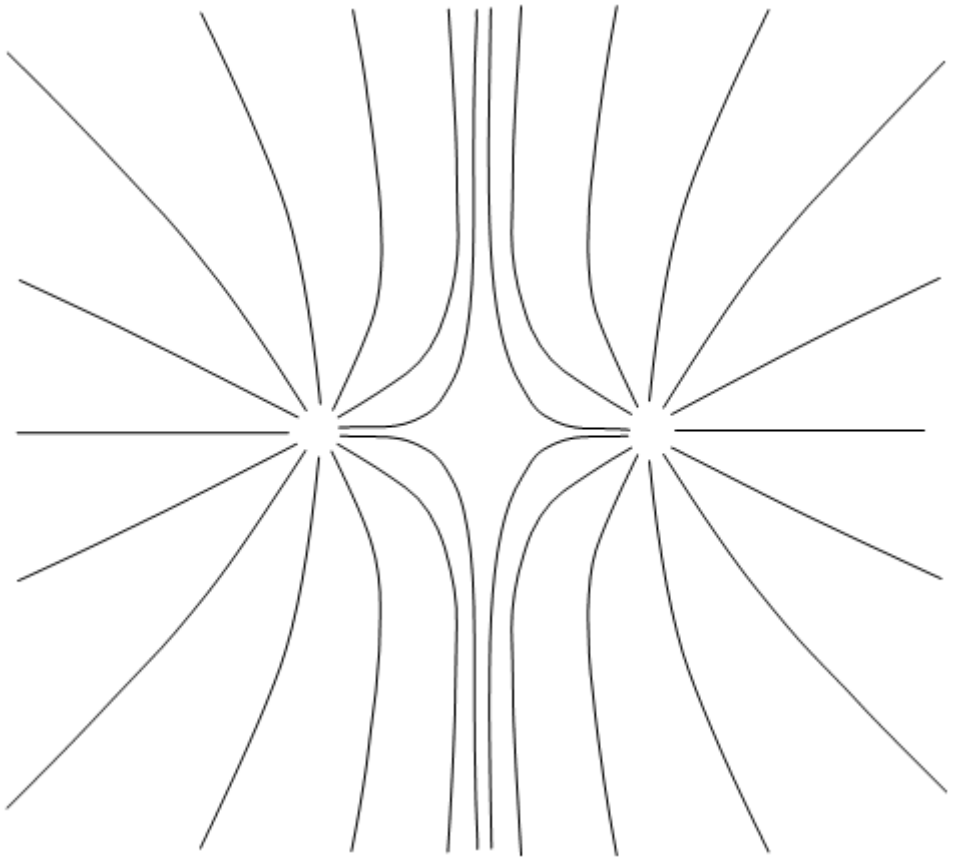


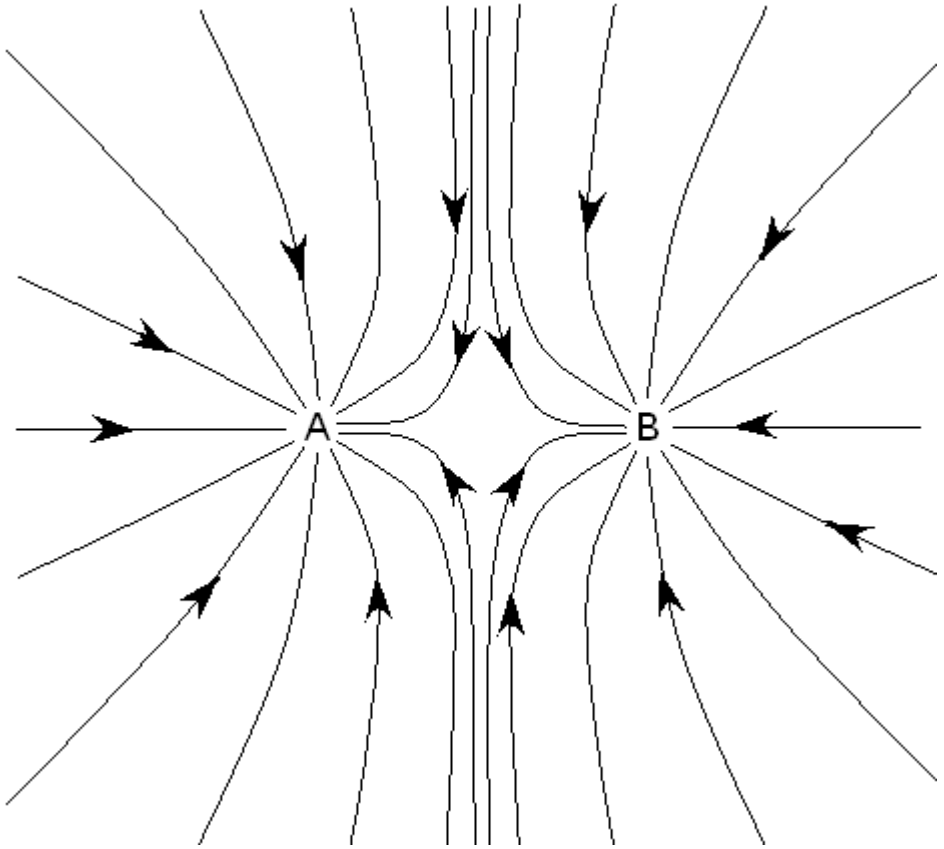
22.4.5. Consider the electric field lines shown in the drawing. Which of the following statements correctly describes this situation?

a) A and B are both positively charged particles.

b) A and B are both negatively charged particles.

c) A is a positively charged particle and B is a negatively charged particle.

d) B is a positively charged particle and A is a negatively charged particle.



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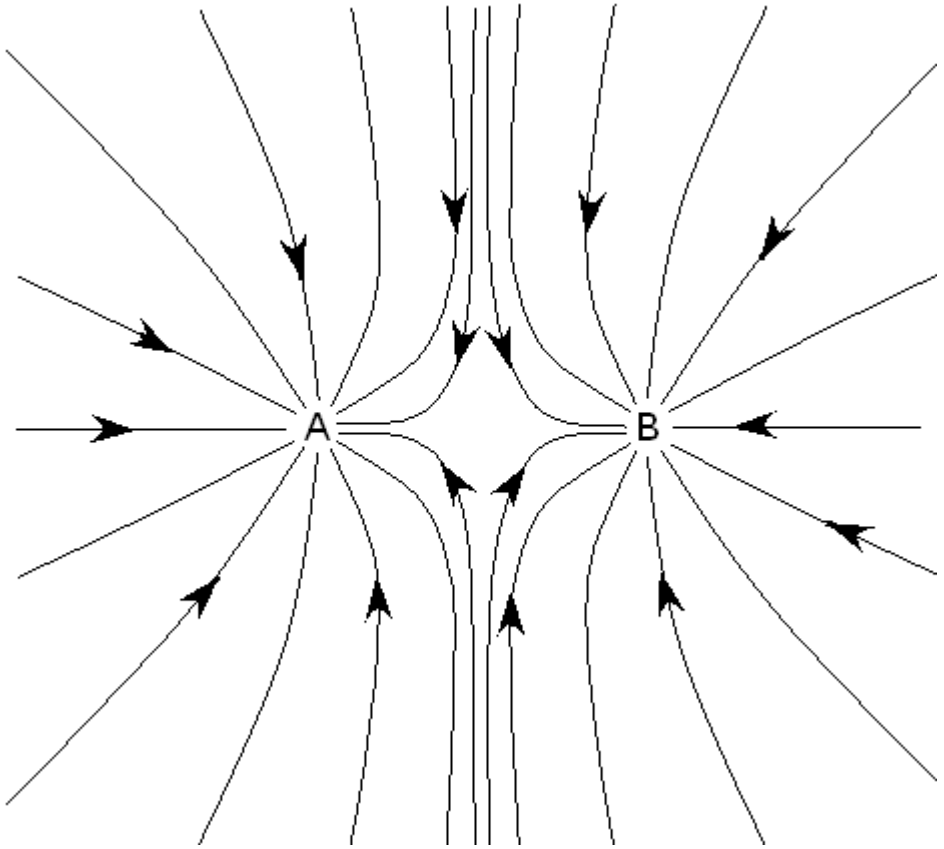


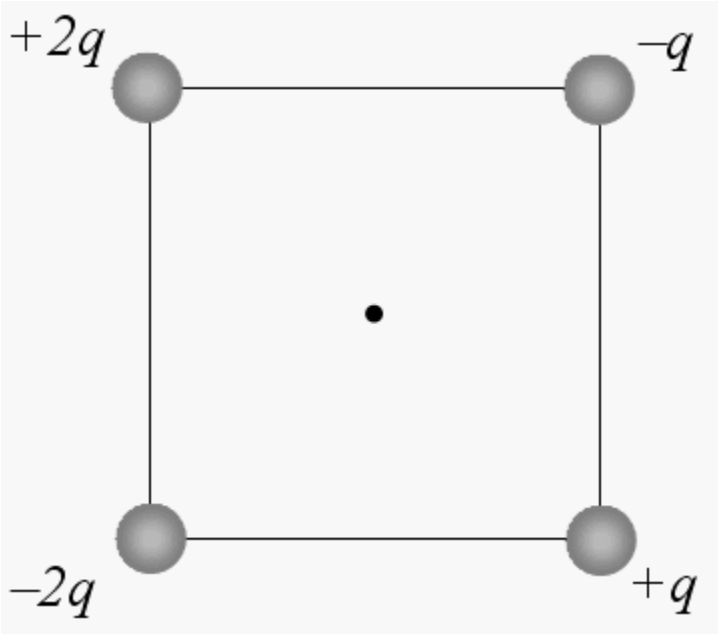
22.4.7. Four charges are located on the corners of a square as shown in the drawing. What is the direction of the net electric field at the point labeled P?

a) toward the upper left corner of the square

b) toward the middle of the right side of the square

c) toward the middle of the bottom side of the square

d) toward the lower right corner of the square



e) There is no direction. The electric field at P is zero N/C.

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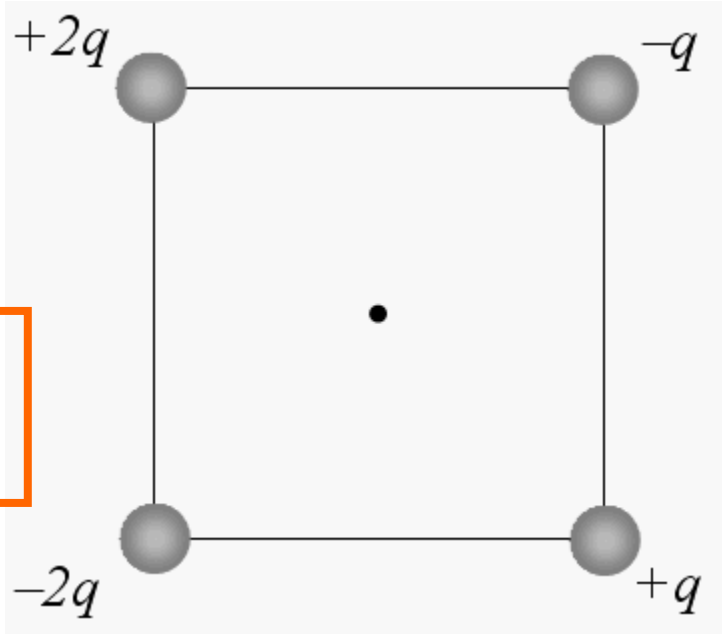

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22.7.1. Two parallel infinite sheets of charge carry equal charge distributions σ of opposite sign. Which of the following expressions gives the electric field in the region between the infinite sheets?

a) $E = \sigma\varepsilon_0$

b) $E = \dfrac{\sigma}{\varepsilon_0}$

c) $E = \dfrac{\sigma}{2\varepsilon_0}$

d) $E = \dfrac{\sigma}{4\varepsilon_0}$

e) This cannot be answered without knowing the distance between the sheets.

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22.8.1. A positively-charged object is released from rest in a region containing a uniform electric field. Which one of the following statements concerning the subsequent motion of the object is correct?

a) The object will remain motionless.

b) The object will accelerate to some constant speed and move in the direction of the electric field.

c) The object will accelerate to some constant speed and move in the direction opposite that of the electric field.

d) The object will experience a constant acceleration and move in the direction of the electric field.

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e) The object will experience a constant acceleration and move in the direction opposite that of the electric field.

22.8.2. Consider the drawing, where the solid lines with arrows represent the electric field due to the charged object. An electron is placed at the point P and released from rest. Which of the following vectors represents the direction of the force, if any, on the electron?

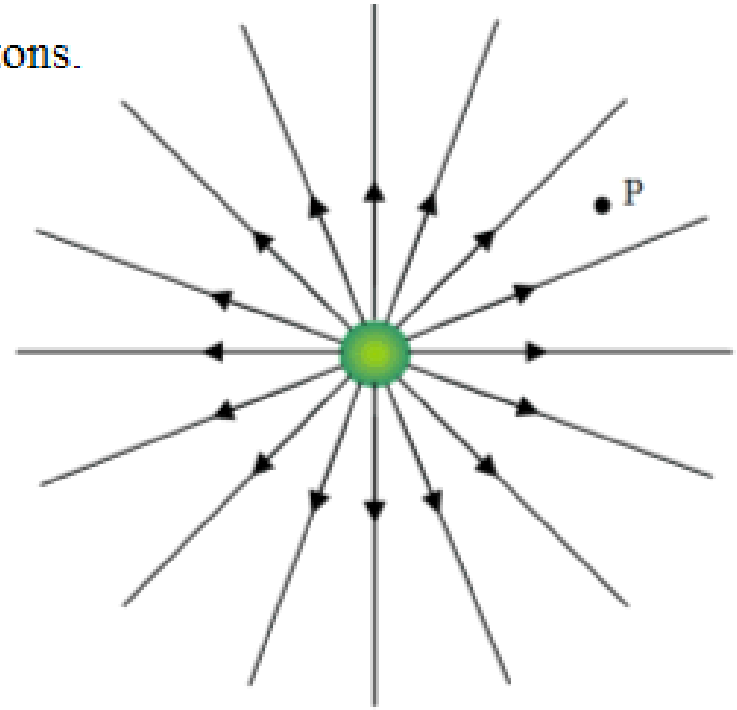
a) The electric force will be zero newtons.

b) 

c) 

d) 

e) 



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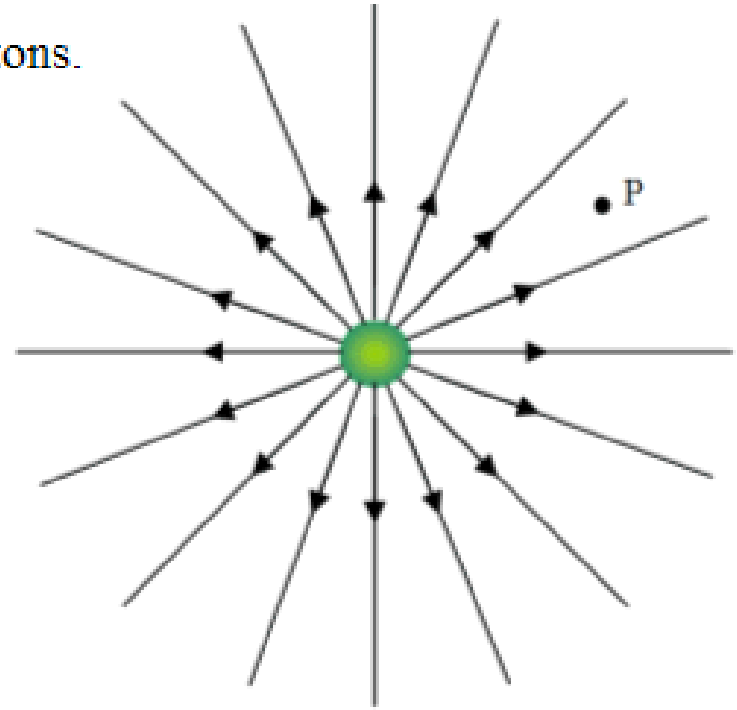

22.8.3. An electron traveling horizontally to the right enters a region where a uniform electric field is directed downward. What is the direction of the force exerted on the electron once it has entered the field?

a) upward

b) downward

c) to the right

d) to the left

e) The force is zero newtons.

22.8.3. An electron traveling horizontally to the right enters a region where a uniform electric field is directed downward. What is the direction of the force exerted on the electron once it has entered the field?

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d) to the left

e) The force is zero newtons.

22.9.1. A single, positive test charge is brought near a dipole. Under what circumstances will the force exerted on the test charge by the dipole be given by $F = \frac{de^2}{2\pi\varepsilon_0 z^3}$?

a) the test charge is a much greater charge than that of the dipole

b) the test charge is a much smaller charge than that of the dipole

c) the test charge is very far from the dipole compared to the distance between the dipole charges

d) the test charge on a line that passes through the dipole axis

e) the test charge on a line is perpendicular to the dipole axis

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