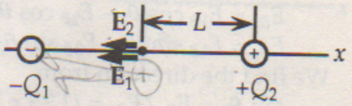
23. If we take the positive direction to the south, we have
$F = qE;$
$3.2 \times 10^{-14}\ \text{N} = (+\ 1.60 \times 10^{-19}\ \text{C})E$, which gives $E =$ $\boxed{+\ 2.0 \times 10^5\ \text{N/C (south).}}$

24. If we take the positive direction up, we have
$F = qE;$
$+\ 8.4\ \text{N} = (-\ 8.8 \times 10^{-6}\ \text{C})E$, which gives $E =$ $\boxed{+\ 9.5 \times 10^5\ \text{N/C (up).}}$

25. The electric field above a positive charge will be away from the charge, or up.
We find the magnitude from
$E = kQ/r^2$
$= (9.0 \times 10^9\ \text{N}\cdot\text{m}^2/\text{C}^2)(33.0 \times 10^{-6}\ \text{C})/(0.300\ \text{m})^2 =$ $\boxed{3.30 \times 10^6\ \text{N/C (up).}}$

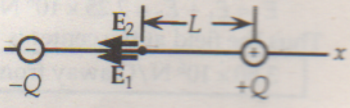
26. The directions of the fields are determined from the signs of the charges and are indicated on the diagram. The net electric field will be to the left. We find its magnitude from



$E = kQ_1/L^2 + kQ_2/L^2 = k(Q_1 + Q_2)/L^2$
$= (9.0 \times 10^9\ \text{N}\cdot\text{m}^2/\text{C}^2)(8.0 \times 10^{-6}\ \text{C} + 6.0 \times 10^{-6}\ \text{C})/(0.020\ \text{m})^2$
$= 3.2 \times 10^8\ \text{N/C}.$
Thus the electric field is $\boxed{3.2 \times 10^8\ \text{N/C toward the negative charge.}}$

27. The acceleration is produced by the force from the electric field:
$F = qE = ma;$
$(-\ 1.60 \times 10^{-19}\ \text{C})E = (9.11 \times 10^{-31}\ \text{kg})(125\ \text{m/s}^2)$, which gives $E = -\ 7.12 \times 10^{-10}\ \text{N/C}.$
Because the charge on the electron is negative, the direction of force, and thus the acceleration, is opposite to the direction of the electric field, so the electric field is $\boxed{7.12 \times 10^{-10}\ \text{N/C (south).}}$

28. The directions of the fields are determined from the signs of the charges and are in the same direction, as indicated on the diagram.
The net electric field will be to the left. We find its magnitude from



$E = kQ_1/L^2 + kQ_2/L^2 = k(Q + Q)/L^2 = 2kQ/L^2$
$1750\ \text{N/C} = 2(9.0 \times 10^9\ \text{N}\cdot\text{m}^2/\text{C}^2)Q/(0.080\ \text{m})^2$, which gives
$\boxed{Q = 6.2 \times 10^{-10}\ \text{C.}}$

29. From the diagram, we see that the electric fields produced by the charges will have the same magnitude, and the resultant field will be down.
The distance from the origin is x, so we have
$E_+ = E_- = kQ/r^2 = kQ/(a^2 + x^2).$
From the symmetry, for the magnitude of the electric field we have
$E = 2E_+ \sin\theta = 2[kQ/(a^2 + x^2)][a/(a^2 + x^2)^{1/2}]$
$=$ $\boxed{2kQa/(a^2 + x^2)^{3/2}\ \text{parallel to the line of the charges.}}$