p. 349 #1–3

1. $\mathcal{E} = 145\ N/C$
$d_1 = 1.5m$
$d_2 = 4.6m$

a) $\Delta E_e = ?$
$q = 1.602 \times 10^{-19} C$

$\Delta E_e = W = F \Delta d$
but $F_e = q\mathcal{E}$

$\therefore \Delta E_e = q\mathcal{E}(d_2 - d_1)$
$= (1.602 \times 10^{-19} C)(145 N/C)(4.6m - 1.5m)$
$= 7.2 \times 10^{-17} J$

b) $v_1 = 1.7 \times 10^7 m/s$
$v_2 = ?$
$m_e =$

$\Delta E_e = E_k = E_{k_2} - E_{k_1}$
$\Delta E_e = \frac{1}{2} m v_1^2 - \frac{1}{2} m v_2^2$

$\frac{1}{2} m v^2 = \frac{1}{2} m v_1^2 - \Delta E_e$

$v = \sqrt{v_1^2 - \frac{2\Delta E_e}{m}}$

$= \sqrt{(1.7 \times 10^7 m/s)^2 - \frac{2(7.2 \times 10^{-17} J)}{9.1 \times 10^{-31} kg}}$

$= 11442549.67\ m/s$
$= 1.1 \times 10^7 m/s$

2. $W = ?$
$d = 0.75m$
$\mathcal{E} = 23 N/C$
$q = 1.602 \times 10^{-19} C$

$W = q\mathcal{E}d$
$= (1.602 \times 10^{-19} C)(23 N/C)(0.75m)$
$= 2.8 \times 10^{-18} J$

3. $\Delta E_k = 4.2 \times 10^{-16} J$
$\mathcal{E} = ?$
$d = 0.18m$ [r]
$q = 1.602 \times 10^{-19} C$

$\Delta E_e = \Delta E_k$
$q\mathcal{E}d = \Delta E_k$
$\mathcal{E} = \frac{\Delta E_k}{qd}$

$\mathcal{E} = \frac{4.2 \times 10^{-16} J}{(1.602 \times 10^{-19} C)(0.18m)}$

$= 1.4 \times 10^4 N/C$ [left]