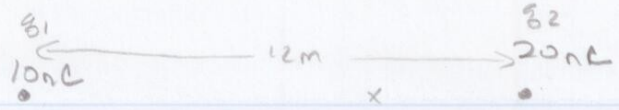
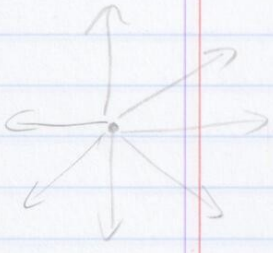


A. $E_1 = \frac{k|q_1|}{r_{1P}^2} = \frac{8.89\times10^{9}\ \frac{N\cdot m^2}{C^2}\ 10\times10^{-9}C}{(8m)^2}$

$= 1.4\ N/C$

$E_2 = \frac{k|q_2|}{r_{2P}} = \frac{8.89\times10^{9}\ \frac{N\cdot m^2}{C^2}\ 20\times10^{-9}C}{(4m)^2}$

$= 11.24\ N/C$



E_1 points to the right so $+1.4\ N/C$
E_2 points to the left so $-11.24\ N/C$

$E_{TOT} = E_1 + E_2 = 1.4\ N/C + -11.24\ N/C = \boxed{-9.8\ N/C}$

B. $F_{e1} = \frac{k|q_e q_1|}{r^2} = \frac{8.89\times10^{9}\ \frac{N\cdot m^2}{C^2}\cdot 1.6\times10^{-19}C\cdot 10\times10^{-9}C}{(8.0m)^2}$

$= 2.2\times10^{-19}\ N$

$F_{e2} = \frac{k|q_e q_2|}{r^2} = \frac{8.89\times10^{9}\ N\cdot m^2/C^2\cdot 1.6\times10^{-19}C\ 20\times10^{-9}C}{(4.0m)^2}$

$= 1.78\times10^{-18}\ N$

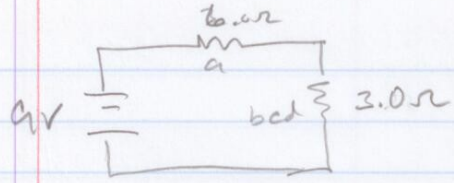
F_{e1} attractive so the electron is pulled left $F_{e1} = -2.2\times10^{-19}N$
F_{e2} attractive " " right $F_{e2} = 1.78\times10^{-18}N$

$F_{e1} + F_{e2} = -2.2\times10^{-19}\ N + 1.78\times10^{-18}\ N$
$\boxed{= 1.6\times10^{-18}\ N}$

— OR —

$F = qE \quad F = -1.6\times10^{-19}C \cdot -9.8\ N/C = \boxed{1.6\times10^{-18}\ N}$

1. Find the equivalent Resistance

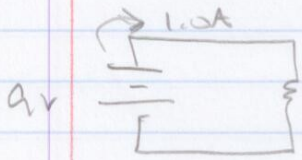


$\frac{1}{6} + \frac{1}{9} + \frac{1}{18} = \frac{1}{R_{bcd}}$

$\frac{3}{18} + \frac{2}{18} + \frac{1}{18} = \frac{1}{R_{bcd}}$

$\frac{6}{18} = \frac{1}{3} = \frac{1}{R_{bcd}}$ $R_{bcd} = 3\Omega$

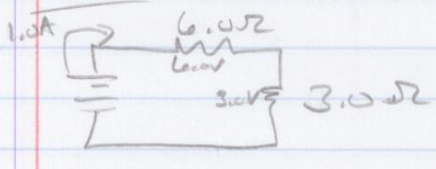
$R_a + R_{bcd} = 6.0\Omega + 3\Omega = 9\Omega$



2. Now find total current in the circuit

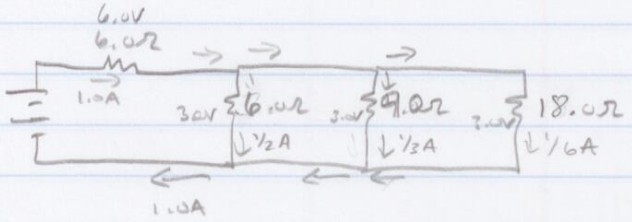
$I = V/R = 9.0V/9.0\Omega = 1.0A$

3. Bild back at



$V_a = 6.0\Omega \cdot 1.0A = 6.0V$

$V_b = 3.0\Omega \cdot 1.0A = 3.0V$



Add resistors in Parallel and each will have the same voltage 3.0 V

Find current in each $I_b = V_b/R_b = 3.0V/6.0\Omega = \frac{1}{2}A$

$I_c = V_c/R_c = 3.0V/9.0\Omega = \frac{1}{3}A$

$I_d = V_d/R_d = 3.0V/18\Omega = \frac{1}{6}A$

Check $\frac{1}{2}A + \frac{1}{3}A + \frac{1}{6}A = 1A$ ✓

$P_a = I_A \Delta V_A = 1.0A \cdot 6.0V = 6W$ ← brightest

$P_b = I_b \Delta V_b = \frac{1}{2}A \cdot 3.0V = 1.5W$

$P_c = I_c \Delta V_c = \frac{1}{3}A \cdot 3.0V = 1.0W$

$P_d = I_d \Delta V_d = \frac{1}{6}A \cdot 3.0V = 0.5W$ ← dimmest