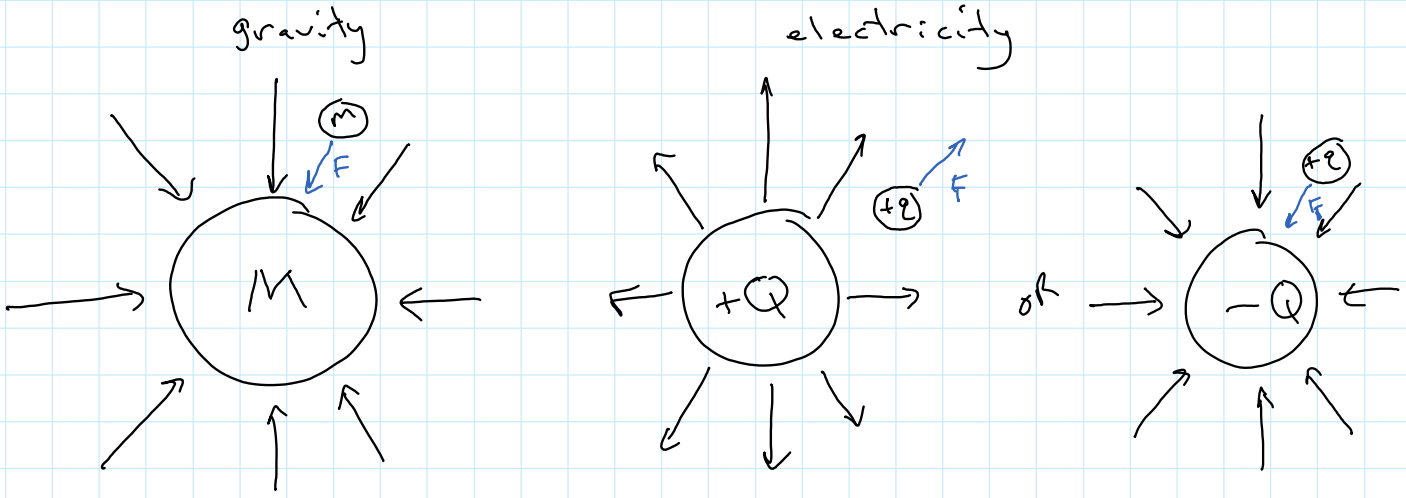
Phy 2B 1/12

Monday, January 12, 2015 9:51 AM

Fields:



worksheet p. 21

E at point

A	South
B	South
C	North
D	North
E	North
F	South
G	North
H	South

Tangent to field line

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a) Lines originate on Positive charges and terminate on Negative charges

b) direction of E at a point is tangent to the field lines

c) Magnitude of E is greater where field lines are closer together

d)

gravity: $F = \frac{G m_E}{R_E^2} m$

g gravitational field at surface of Earth

$F = g m$

$\vec{F} = m \vec{g}$

electric: $\vec{F} = q \vec{E}$

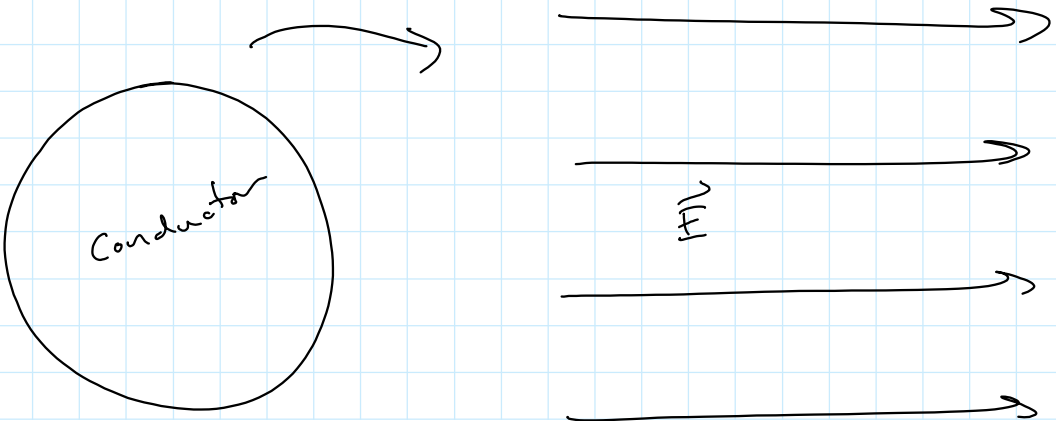
OR

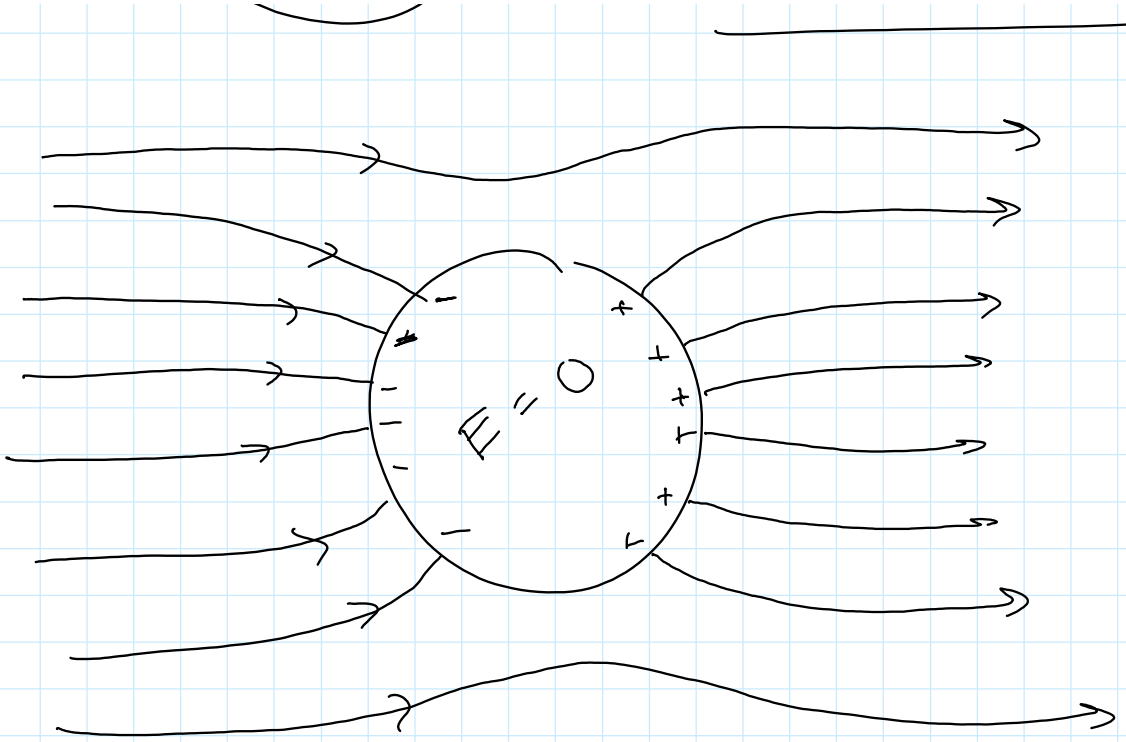
$\vec{E} = \frac{\vec{F}}{q}$

For a pt charge: $F = \frac{k q_1 q_2}{r^2}$

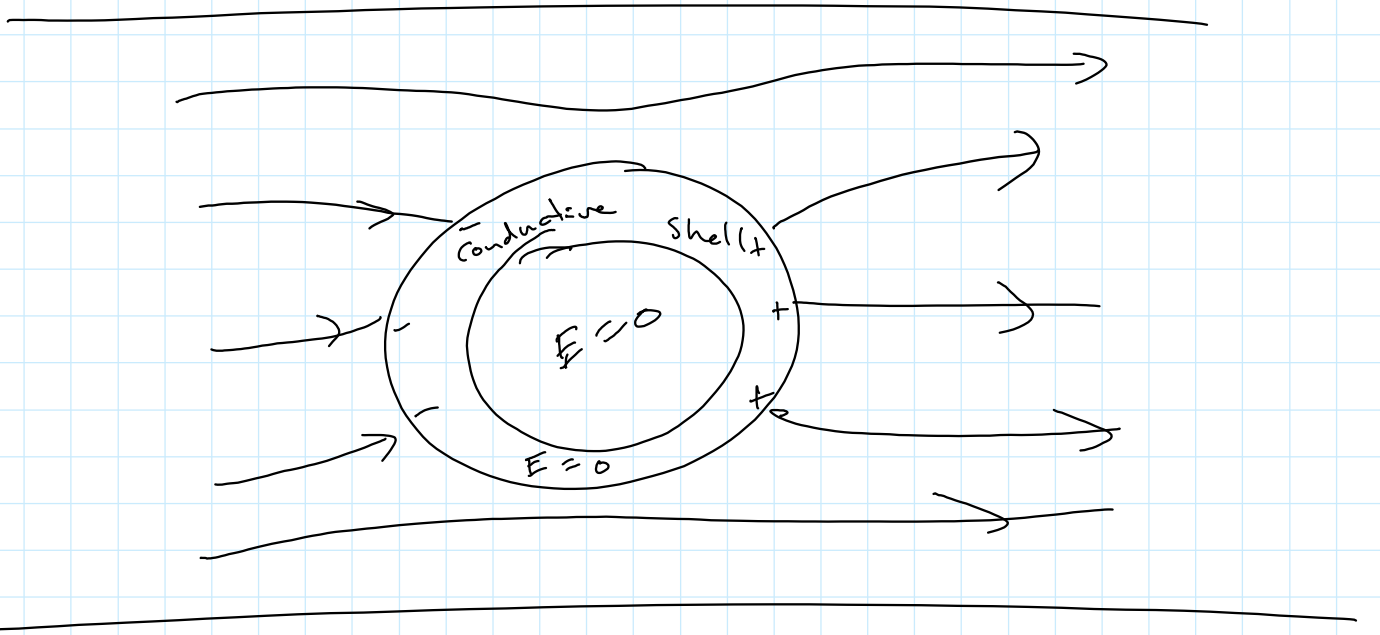
$E = \frac{k q_1}{r^2}$ Electric field due to charge q_1

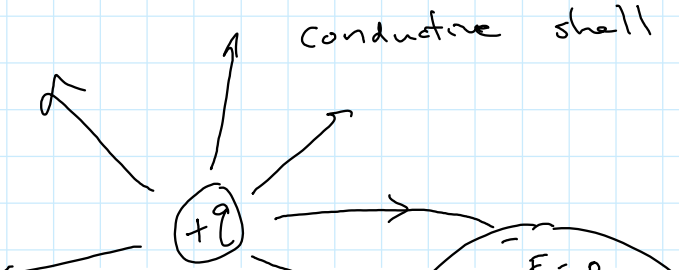
Inside Conductors

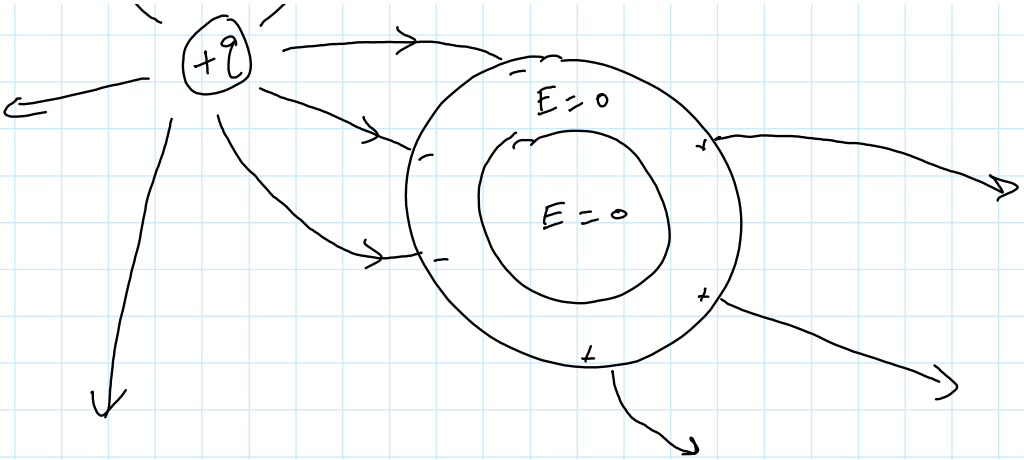




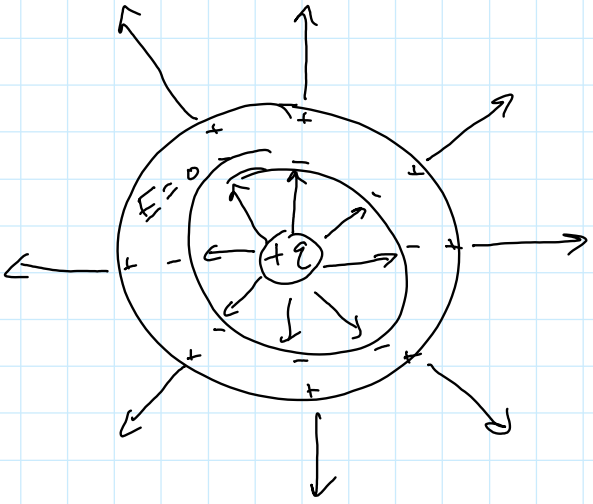
E is always zero inside conductors in electrostatic equilibrium







Now,



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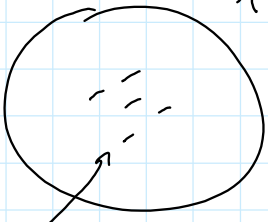
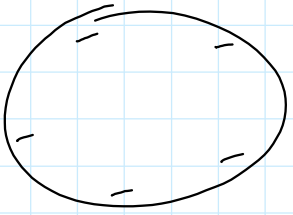
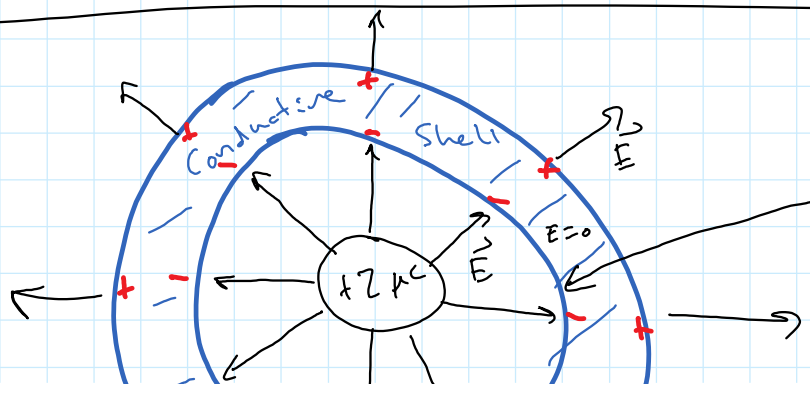
conductive sphere



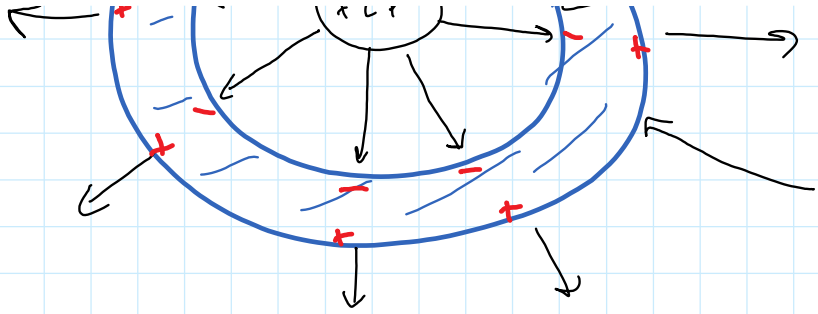
add extra electrons at center



excess charge goes to outer surface



$Q_{inner} = -2\,\mu C$



$Q_{outer} = +2\ \mu C$

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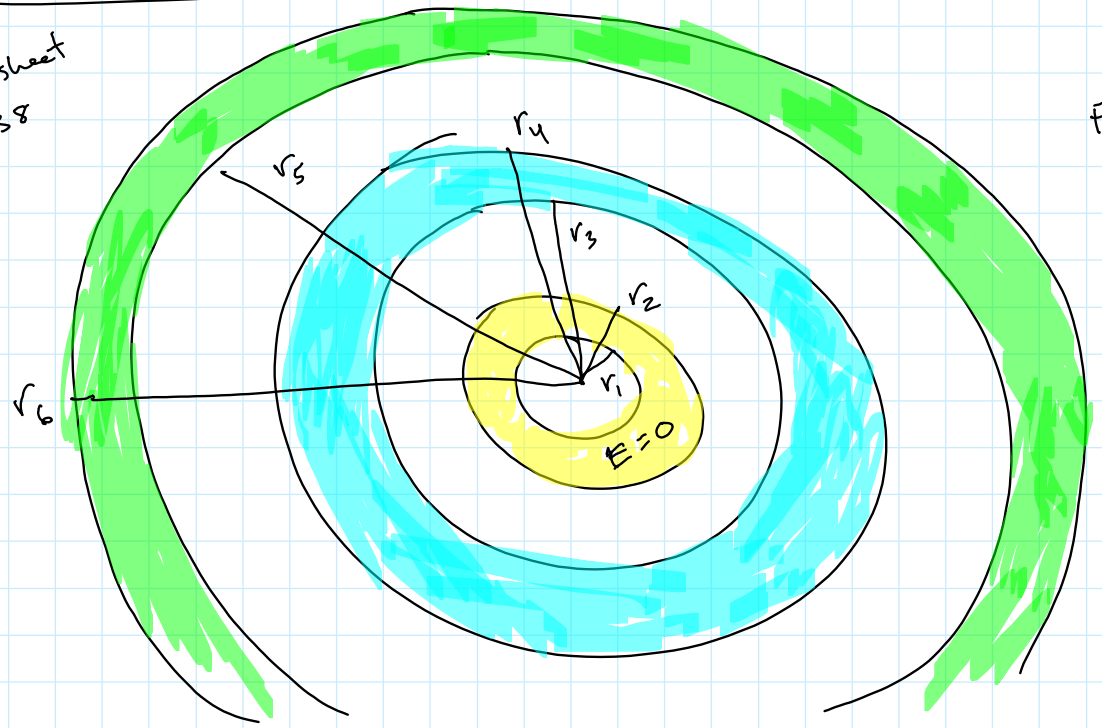


Find

q_1 at r_1

q_2 at r_2

q_3 at r_3

q_4 at r_4

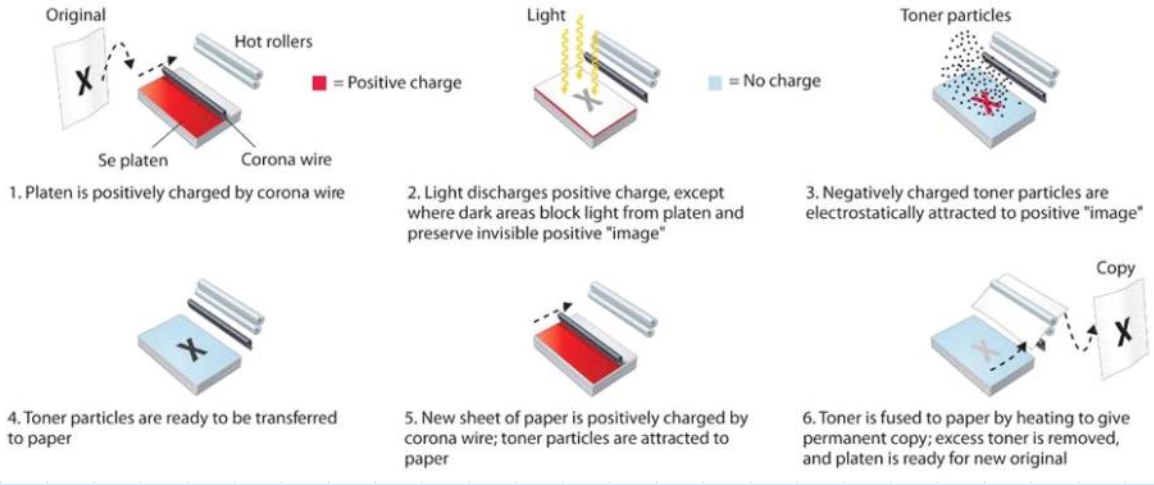
⋮

$q_1 = 0$, $q_2 = +1\ \mu C$ $\Rightarrow$ $q_1 + q_2 = q_{shell} = 1\ \mu C$

$q_3 = -1\ \mu C$, $q_4 = -3\ \mu C$ $\Rightarrow$ $q_3 + q_4 = -4\ \mu C$

$q_5 = +3\mu C$, $q_6 = +16\ \mu C$ $\Rightarrow$ $q_5 + q_6 = +19\ \mu C$

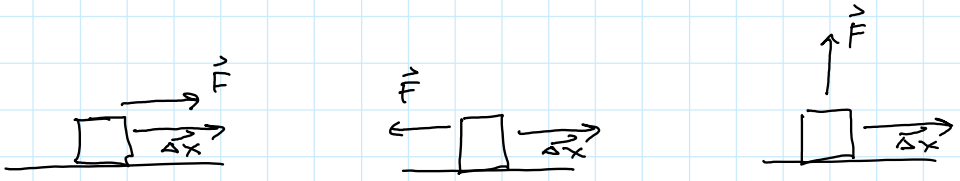
Application of the day: photocopy machine



Potential

Worksheet P. 42

A) $W > 0$ $W < 0$ $W = 0$



$$W = \vec{F} \cdot \Delta\vec{x} = |F||\Delta x| \cos\theta$$

B) 1) $W_{F_1} < 0$

2) $W_{F_2} > 0$

3) $W_{Net} = 0$

4) equal

C) 1) $W_{F_3} < 0$

2) $W_{F_4} > 0$

3) $W_{Net} < 0$

4) less

D) $(Work)_{Net} = \Delta KE$

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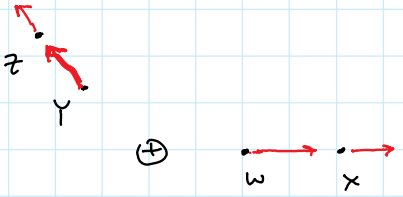
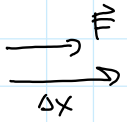
D) $(\text{Work})_{\text{Net}} = \Delta K \pm$

II) A)



B) $W > 0$



$$W_{w \to x} = - W_{x \to w}$$

C) $W = 0$