PHYSICS 2B 1-22-14 (Happy New Year!)

CH 17

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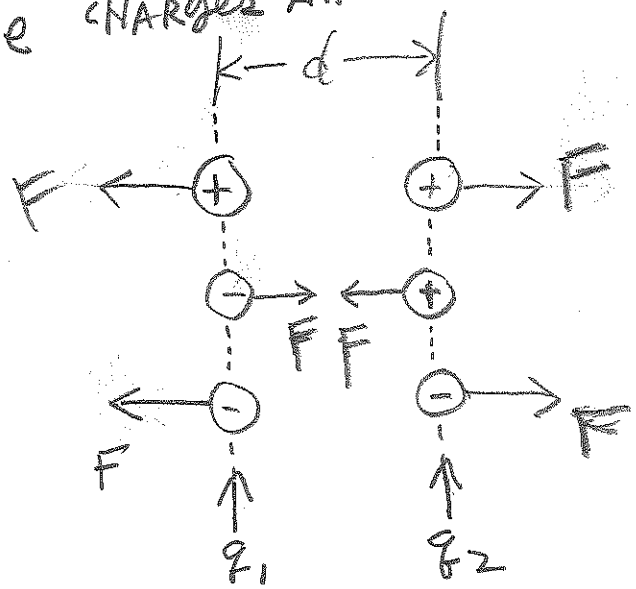
LIKE CHARGES REPEL; UNLIKE CHARGES ATTRACT:



COULOMB'S LAW:

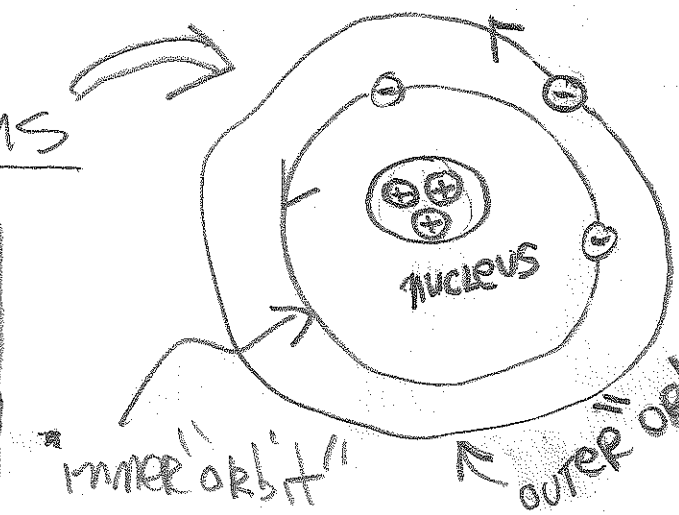
$$F = \frac{k \cdot |q_1 \cdot q_2|}{d^2}$$

$$k \cong 9 \times 10^9 \frac{N \cdot m^2}{C^2}$$

C = coulomb (CHARGE UNIT)

MOST OBJECTS ARE COMPOSED OF EQUAL ⊕ AND ⊖ CHARGES (NEUTRAL).

ATOMS



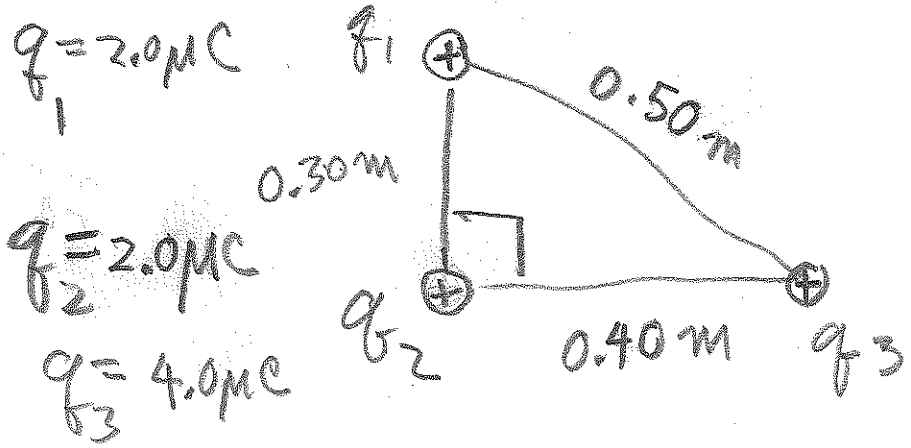
LITHIUM:
3 PROTONS IN NUCLEUS.
3 "ORBITING" ELECTRONS.

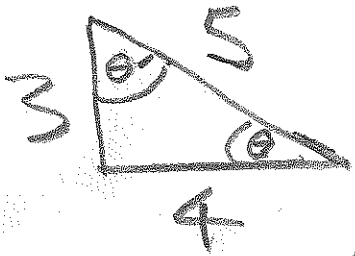
SEE ALSO EXAMPLE 17.2 GRAVITY IN HYDROGEN ATOM.

Conductors: "Loosely Bound" outer valence electrons hop from atom to atom in the metal: electrons are mobile.

Insulators: electrons are tightly bound and don't travel inter-atomically: rubber, plastics, etc.

Example 17.4:





$\theta = 37^\circ$

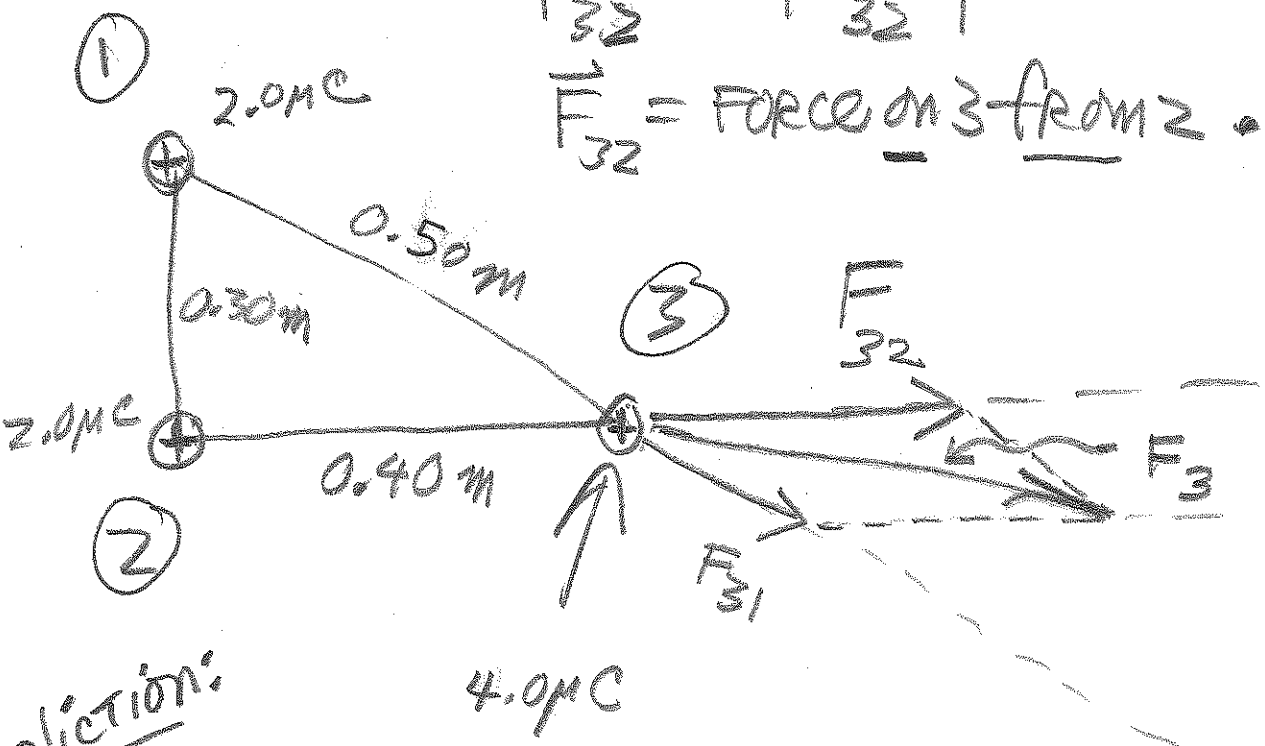
$\theta' = 53^\circ$

90°

$\vec{F}_3 = ?$

$F_{32} = |\vec{F}_{32}|$

$\vec{F}_{32}$ = Force on 3 from 2.



Prediction:

$F_{31} < F_{32}$

$0.50\,m > 0.40\,m$

"Homework" Assignment:

Find $\vec{F}_3$ using component method

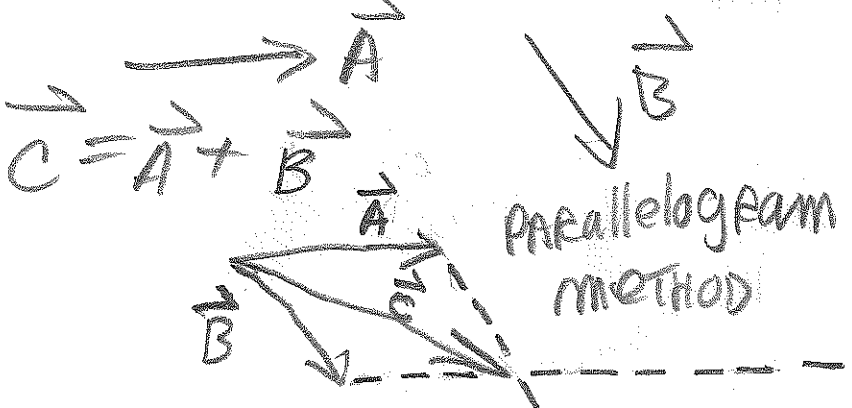
$F_{3x} = F_{31x} + F_{32x}$

$F_{3y} = F_{31y} + F_{32y}$

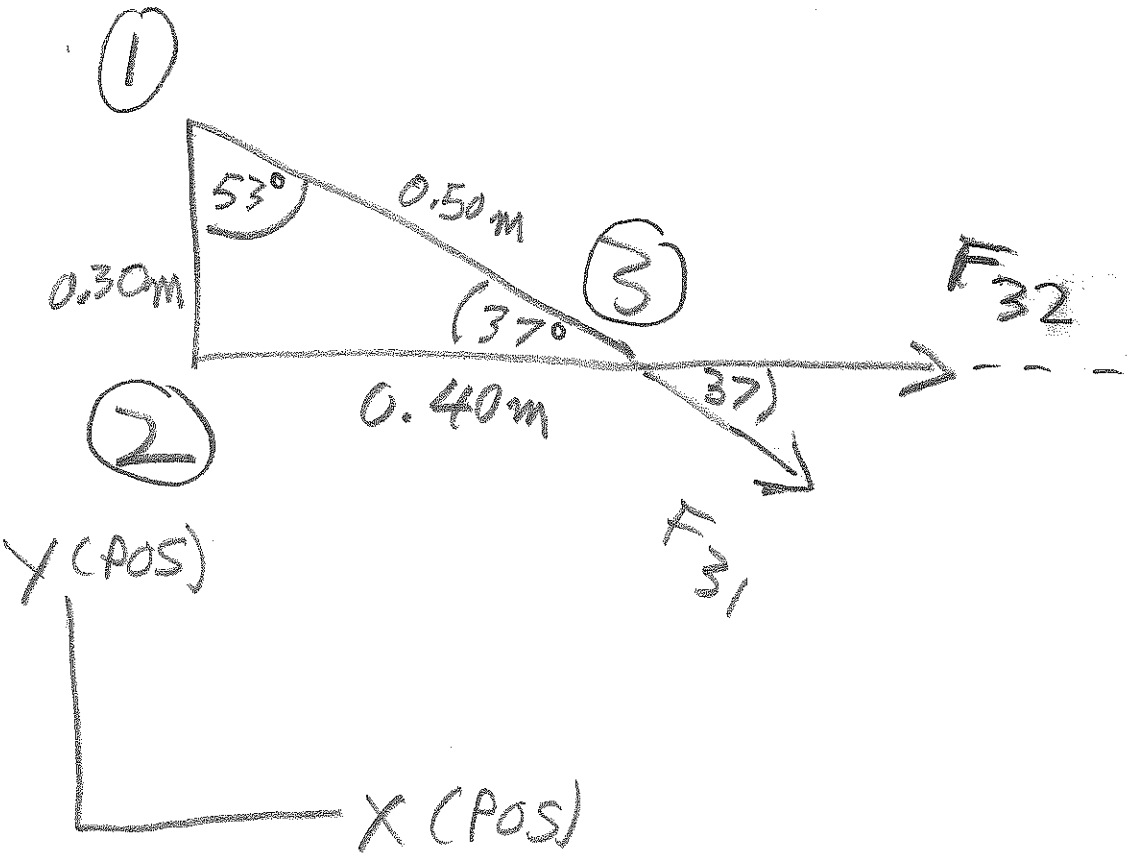
Review Ch 1 (vectors)

Physics 2A review:

$\vec{C} = \vec{A} + \vec{B}$



parallelogram method



$$F_{31x} = F_{31} \cdot \cos 37$$

$$F_{31} = \frac{k \cdot |q_3 \cdot q_1|}{(0.50\,m)^2}$$

ADD

$$F_{32x} = F_{32} \cdot \cos 0 = F_{32}$$

$$= \frac{k \cdot |q_3 \cdot q_2|}{(0.40\,m)^2}$$

ADD

$$F_{31y} = -\frac{k|q_3 \cdot q_1|}{(0.50m)^2} \cdot \sin 37$$

$$F_{32y} = 0 = F_{32} \cdot \sin 0$$