Estat #4

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p523 - Multiple Choice

(13)

6) A+B separated by d, Force F
separate to 1.4d, new F?

$$F = \frac{kqq}{r^2} = \frac{1 \cdot 1 \cdot 1}{(1.4)^2} = \frac{1}{1.96} F \sim \frac{1}{2} F$$

(3)

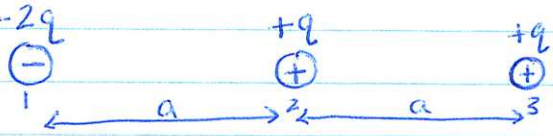
7) new F when $\frac{1}{2} q_A$ $\frac{1}{4} q_B$ $\frac{1}{2} d$

$$F = \frac{kqq}{r^2} = \frac{1 \cdot \frac{1}{2} \cdot \frac{1}{4}}{(\frac{1}{2})^2} = \frac{\frac{1}{8}}{\frac{1}{4}} \quad \frac{1}{8} \times \frac{4}{1} = \frac{1}{2} F$$

8) A charge q Hang from threads
B charge 10q Choose all you agree

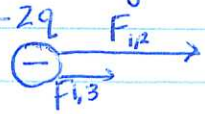
X a) F_A is $\frac{1}{10}$ F_B
X b) F_A is 10x F_B
✓ (c) F_A is same F_B
X d) θ_A is less than θ_B

p527 - Problems

40) 

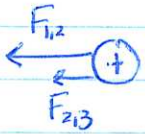
Draw F diagram

part A - charge 1

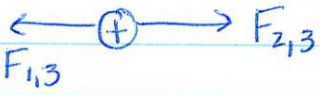


(1)

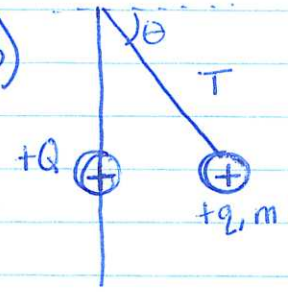
part B - charge 2



part C - charge 3

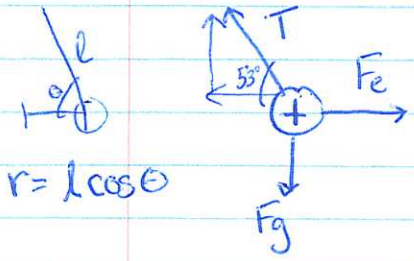


45)



$m = .060\,kg$
$q = 3.0 \times 10^{-6} C$
$\ell = .50\,m$
$\theta = 53°$ below horizontal

a) determine Q



$\Sigma F_y = 0N$
$T_y - F_g = 0N$
$T \sin\theta = mg$
$T = \frac{mg}{\sin\theta}$

$\Sigma F_x = 0N$
$T_x = F_e$
$T \cos\theta = \frac{kQq}{r^2}$

$\frac{mg}{\tan\theta} = \frac{kQq}{\ell^2 \cos^2\theta}$

(1) $Q = \frac{mg\ell^2 \cos^2\theta}{kq \tan\theta}$

$= \frac{(.060kg)(9.81 m/s^2)(.50m)^2 \cos^2 53°}{(8.99 \times 10^9 \frac{Nm^2}{C^2})(3.0 \times 10^{-6} C) \tan 53°}$

$= 1.49 \times 10^{-6} C$

b) What else can be determined?

- Tension in string
- Electrical force b/t 2 charges

more

45 continued)

c) Find $F_e = ?$

$$F_e = \frac{kqQ}{r^2} = \frac{kqQ}{\ell^2 \cos^2\theta}$$

$$= \frac{8.99 \times 10^9 \frac{Nm^2}{C^2} (3.0 \times 10^{-6} C)(1.49 \times 10^{-6} C)}{(.50m)^2 \ (\cos^2 53^\circ)}$$

(1)

$$F_e = .44\ N$$

d) Find $F_t = ?$

$$T = \frac{mg}{\sin\theta} = \frac{(.060kg)(9.81 m/s^2)}{\sin 53^\circ}$$

$$= .74\ N$$

p529 - Reading

64) You rub a balloon against wool sweater + it sticks. Why?

- molecules on wool redistribute charge so charge opposite balloon is nearest

65) Laundry. Sock sticks to shirt. You pull off sock + do +W. Main form E ↑

(5)

- electric potential

67) You add fabric softner to stop cling.

- Join cloth molecules + make a conductive layer that prevents excess charge from accumulating on the clothes

68) You put strips of aluminum foil in dryer w/ clothes

- Clothes uncharged b/c transfer excess charge to strips which transfer it to metal dryer walls.

69) Remove charge from clean slacks w/ metal clothes hanger

- Charge travels from cloth to the metal to hand through body to ground.

p569 - Concept

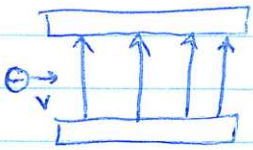
9) How do we create E field w/ // lines + uniform density?

To create electric field w/ // lines + uniform density, we can use a very large sheet of meta w/ charge ①

(1) + examine the space close to the sheet

+ away from the corners

14) Electron moving horizontal L → R enters E field point to top page



A) Direction of F?

Down

(1)

B) Direction of a?

Down

c) motion in grav field similar?

· object thrown horizontally