Key
3/2011
Per XX

CH 32 1-22, 46-52

CH 32 #1

20/20

1. Electrical force attracts & repels.

2. Charge is the property similar to mass.

★ 3. They have same magnitude, but opposite charges.

4. Yes. All electrons are identical.

★ 5. Proton (way more)

6. The number is the same (no net charge)

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★ 7. a. Like charges repel.
b. Unlike charges attract.

★ 8. A negative ion has extra electrons.
A positive ion has lost electrons.

9. It is neither created or destroyed, only transferred.

10. a. Negatively

b. Positively

★ 11. a. Both are "inverse-square" laws

(2pt.) b. Newton's - mass ; only attracts

Coulomb's - charge ; attracts, repels

12. Coulomb (C)

13. Electrical force is stronger than gravity.

★ 14. a. Free (or loose electrons)
b. Bound electrons

15. A material that can behave as an insulator or conductor.

★ 16. Contact & Friction

17. Induction

18. Electrical discharge
(Cloud - cloud
cloud - Ground)

19. To prevent discharge & conduct charge to ground.

20. Negative on one side, positive on the other.

21. The opposite charges are closer.

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★ 22. A molecule with uneven distribution of charge (like H_2O)

★ 46. $e^- = 1.6 \times 10^{-19}$ C How many 1 C

$$\frac{1\text{ C}}{1.6\times10^{-19}\text{ C}/e^-} = 6.25\times10^{18}\ e^-$$

★ 47. (2 pts) $F_e = K\frac{q_1 q_2}{d^2}$

a. if d is doubled:

$$\frac{F_{e2}}{F_{e1}} = \frac{K\frac{q_1 q_2}{(2d)^2}}{K\frac{q_1 q_2}{d^2}}$$

$$= \frac{1}{4}$$

b. Tripled?

$$\frac{F_{e2}}{F_{e1}} = \frac{K\frac{q_1 q_2}{(3d)^2}}{K\frac{q_1 q_2}{d^2}}$$

$$= \frac{1}{9}$$

★48. $q_1 = 1\mu C$ $d = .3m$

$q_2 = 1\mu C$

$F_e = k\frac{q_1 q_2}{d^2}$

$= 9.0\times10^9 \frac{N\cdot m^2}{C^2} \times \frac{(1.0\times10^{-6}C)^2}{(.3m)^2}$

$\boxed{F_e = 0.1N}$

★49. (+40μC) (−10μC)

$+40 - 10 = 30\mu C$ Net

2 spheres so:

$\boxed{Q = 15\mu C \quad ea}$

★50. $q_1 = 15\mu C$

$q_2 = ?$

$d = 1.2m$ } Find X

$F_e = 2.8N$

$F_e = k\frac{q_1 q_2}{d^2}$

$\frac{F\cdot d^2}{kq_1} = q_2$

$\frac{2.8N\cdot(1.2m)^2}{\left(9.0\times10^9 \frac{N\cdot m^2}{C^2}\right)(15\mu C)} = q_2$

$\boxed{q_2 = 30\mu C}$

$\boxed{q_2 = 30\times10^{-6}C}$

★ 51. $F_e = k\frac{q_1 q_2}{d^2}$

(5pt)

a. $q_1 = 1/2$

$\boxed{F_e = \frac{1}{2}}$

b. $q_1 = 2x$

$q_2 = 2x$

$\boxed{F_e = 4x}$

c. $d = 3x$

$\boxed{F_e = \frac{1}{9}}$

d. $d = 1/4$

$\boxed{F_e = 16x}$ ← (4^2)

e. $q_1 = 2x$
$q_2 = 2x$
$d = 2x$

$\boxed{F_e = 1}$ (no change)

★ 52. $F = 2.5N$

$d = .3\,m$

$q_1 = q_2$ Find q_1

$F_e = k\frac{q_1 q_2}{d^2}$

$\sqrt{\frac{F_e \cdot d^2}{k}} = q$

$\boxed{q = 5.0\,\mu C}$

$\sqrt{\frac{(2.5N)(.3m)^2}{9.0\times10^9 \frac{N\cdot m^2}{C^2}}} = q$