Chapters 16-21: Electricity

Homework Check A (collected Mon, Apr 28)

Chapter 16

Coulomb's Law   p. 469 #1, 2, 3, 6, 7, 11 ....Complete by Mon, Apr 21

> STAMP
> HERE
> 5 POINTS

Electric Field   pp. 469-470 #19, 20, 22, 25, 32 ....Complete by Fri, Apr 25

> STAMP
> HERE
> 5 POINTS

Ch 16 Conceptual Questions   p. 220 #2, 8, 10, 14, 15 .... Complete by Fri, Apr 25
   THESE QUESTIONS SHOULD HAVE AT LEAST ONE FULL SENTENCE OF EXPLANATION

> STAMP
> HERE
> 4 POINTS

Chapter 17

Electric Potential   p. 496 #1, 2, 9 ....Complete by Mon, Apr 28

> STAMP
> HERE
> 3 POINTS

Ch 17 Conceptual Questions   p. 494 #1, 2, 6 ....Complete by Mon, Apr 28
   THESE QUESTIONS SHOULD HAVE AT LEAST ONE FULL SENTENCE OF EXPLANATION

> STAMP
> HERE
> 3 POINTS

Answers

Ch 16

1. 2.7×10^{-3} N
2. 3×10^{14} electrons
3. 2.2×10^4 N
6. 2.69 N
7. 3.76 cm

11. 115.8 N, left
    564.2 N, right
    448.4 N, left
19. 3.94×10^{-16} N, due west
20. 1.16×10^5 N/C, south
22. 8.8×10^5, upward
25. (drawing)

32. 65 cm

Ch 17

1. 5.0×10^{-4} J
2. 2.72×10^{-17} J
9. 42.5 kV

Equations

Electrostatics Equations

$$F = \frac{kq_1q_2}{r^2} \qquad E \equiv \frac{F}{q} = \frac{kq}{r^2} \qquad \Delta V \equiv \frac{\Delta PE}{q} = -\frac{W}{q}$$

Constants

Coulomb Constant	$k = 9.0 \times 10^9 \, \text{Nm/C}^2$
Charge of electron/proton	$e = \pm 1.60 \times 10^{-19} \, \text{C}$
Electron mass	$m_e = 9.11 \times 10^{-31} \, \text{kg}$
Proton mass	$m_p = 1.673 \times 10^{-27} \, \text{kg}$
Neutron mass	$m_n = 1.675 \times 10^{-27} \, \text{kg}$

Chapters 16-21: Electricity

Homework Check B (collected on Test Day)

Chapter 18

Current, Resistance, Ohm's Law   p. 521 #1, 2, 4, 7 .... Complete by Wed, Apr 30

> Stamp
> Here
> 3 Points

Ch 18 Conceptual Questions   p. 520 #2, 3 .... Complete by Wed, Apr 30
   THESE QUESTIONS SHOULD HAVE AT LEAST ONE FULL SENTENCE OF EXPLANATION

> Stamp
> Here
> 2 Points

Chapter 19

Resistors in Series and Parallel   p. 552 #4, 5, 6, 16 .... Complete by Mon, May 5

> Stamp
> Here
> 3 Points

Equivalent Resistance Worksheet   .... Complete by Mon, May 5

> Stamp
> Here
> 4 Points

Ch 19 Conceptual Questions   p. 549 #4, 11, 12 .... Complete by Mon, May 5
   THESE QUESTIONS SHOULD HAVE AT LEAST ONE FULL SENTENCE OF EXPLANATION

> Stamp
> Here
> 3 Points

Bonus Problems!   Ch 16 #15 & 31; Ch 19 #19 .... Turn in separately on test day!

Test will be on Tue, May 6

Answers

Ch 18

1. 10^{19} e/sec
2. 33.5 A-hr or 1.2×10^5 C
4. 26.1 ohms
7. 27.9 A; 8.4×10^4 C

Ch 19

4. 8.81 V

5. 330 ohms; 8.86 ohms
6. Max resistatnce: 2570 ohms; Min resistance: 59.4 ohms

16.

   - Equivalent: $R = 1346.6$ ohm; $I = 8.9$ mA
   - 990 ohm: $V = 8.8$ V; $I = 8.9$ mA
   - 680 ohm: $V = 3.2$ V; $I = 4.3$ mA
   - 750 ohm: $V = 3.2$ V; $I = 4.7$ mA

Equations

Electrostatics Equations

$$F = \frac{kq_1 q_2}{r^2} \qquad\qquad E \equiv \frac{F}{q} = \frac{kq}{r^2} \qquad\qquad V \equiv \frac{PE}{q} = -\frac{W}{q}$$

Circuit Equations

$$I \equiv \frac{\Delta q}{t} \qquad\qquad V = IR \qquad\qquad P = IV = I^2 R = \frac{V^2}{R}$$

$$R_{eq} = R_1 + R_2 + \cdots \qquad\qquad\qquad \frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \vdots$$

Constants

Coulomb Constant	$k = 9.0 \times 10^9 \, \text{Nm/C}^2$
Charge of electron/proton	$e = \pm 1.60 \times 10^{-19} \, \text{C}$
Electron mass	$m_e = 9.11 \times 10^{-31} \, \text{kg}$
Proton mass	$m_p = 1.673 \times 10^{-27} \, \text{kg}$
Neutron mass	$m_n = 1.675 \times 10^{-27} \, \text{kg}$