Name Brian Date

Period

Points available: 30

Physics

Worksheet – Ohms Law Problems

V=IR P=IV

**Most things plugged into a standard wall outlet draw 120V*

1. Which circuit will have brighter bulbs and why? Three identical bulbs connected to a six volt battery in series or 3 identical bulbs connected to a six volt battery in parallel?

Parallel because each circuit branch gets the full 6 volts.
In series, add resistors, current goes down

2. Which battery in question 1 will die out faster and why?

Parallel. - Brighter bulbs = more flow. Battery can only supply a specific amount.

3. What physically happens when a light bulb burns out?

the filament breaks, opening the circuit

4. Which will do more damage; connecting a 110V toaster into a 220V outlet or plugging a 220V toaster into a 110V outlet? Explain your answer.

a 110 into 220 because current will be too high,
In a 220V into a 110, current goes down.

5. K | V
V = 120V | R
I = 4.2A

$V = IR$

$120 = 4.2(R)$

$\boxed{R = 28.6\ \Omega}$

6. K | V
P = 1500W | I
V = 120 | R

$P = IV$

$1500 = I(120)$

$I = 12.5A$

$V = IR$

$120 = 12.5R$

$\boxed{R = 9.6\ \Omega}$

7. K | V
I = 0.25A | V
R = 3800Ω

$V = IR$

$= .25(3800$

$\boxed{V = 950V}$

8. K | V
I = 7.5A | R
V = 120V

$V = IR$

$120 = 7.5R$

$\boxed{R = 16\ \Omega}$

9. K | V
R = 9.6Ω | I
V = 240V

$V = IZ$

$240 = I(9.6$

$\boxed{I = 25A}$

10. K | V
V = 12V | R =
I = 0.6A | E =
t = 60s

$V = IR$

$12 = .6(R)$

$\boxed{R = 20\ \Omega}$

$E = P \cdot t$

$= 7.2(60)$

$\boxed{E = 432\ J}$

$P = IV$

$= 12(6)$

$\boxed{P = 7.2W}$

11. K | V
V = 3.0V | P
I = .320A

$P = IV$
$= 3(.320)$
$\boxed{P = 0.96W}$

OOPS. Wrong Way!
$P = IV$ $V = (IR)$
$P = I(IR)$
$P = I^2R$

12. K | V
V = 120V
$P_1 = 850W$
$P_2 = 1250W$

R is higher on low wattage because flow is lower ∴ R is higher

$850 =$
$P = IV$
$850 = 120(I$
$I = 7.1A$
$V = IR$
$120 = 7.1R$
$\boxed{R = 16.9\Omega}$

$P = IV$
$1250 = 120R$
$I = 10.4A$
$V = IR$
$120 = 10.4R$
$R = 11.5\Omega$

13. K | V
V = 115V | I
P = 110W | R

$P = IV$
$110 = 115I$
$\boxed{I = 0.96A}$
$V = IR$
$115 = 0.96R$
$\boxed{R = 120\Omega}$

14. K | V
V = 120V | # 100W Bulbs
I = 15A

$P = IV$
$= 120(15)$
$P = 1800W$

$P = N(100)$
N = # bulbs

$P = N(100)$
$1800 = N(100)$
$\boxed{N = 18 \text{ bulbs}}$