**Group Work for 18ABDE** Name

**A. Ohm’s Law:** 

1. How much current flows when you hook a 45.0 Ω heater up to a 117 V source?

2. A resistor is connected to 5.00 V and there is a current of 125 mA flowing. What is the resistance?

3. What is the voltage across a 220. Ω resistor with a current of 12.0 mA flowing through it?

4. If you want to limit the current to 0.450 A, what resistance would you use with 12.0 V

**B. Power:** 

5. What must be the current flowing through a 945 Watt heater connected to a 12.0 V source?

6. A 1400. W heater plugs into a 120. V source. What must be its resistance?

7. A 165 W heater has a resistance of 1.85 Ω. At what voltage must it operate?

8. A 385 Ω resistor is rated at 0.250 Watts. What is the maximum current that can flow through it?

**C. Current:** 

9. What time must a 215 mA current flow to deliver 2.30 C of charge?

10. A capacitor bank is charged at an average rate of 0.312 A. What charge is moved in 2.00 minutes?

**D. Crazy Mixed Up Power And Energy:** (Students struggle with these)

11. An elevator motor must draw 15.1 A of current, and lift an 875 kg elevator from the ground to a height of 22.5 m in 58.0 s. What must be the input voltage for the elevator?

12. A 1.95 Ω heater core operating at 32.0 V is used to heat 1.40 liters of water initially at 21.0 oC. What time will it take to reach boiling if it loses no heat to the surroundings? (Cwater = 4186 J kg-1 oC-1)

13. A 78.0 kg go cart is sped up from rest by a motor with an effective resistance of the 0.961 Ω, and that draws an average of 12.5 A of current. What is the final speed of the go cart after 10.0 seconds assuming there is no friction or other losses?

**E. RMS Problems:**

14. A 12.2 Ω heater is connected to an alternating current with a peak voltage of 172 V. What is the power dissipated?

15. A heater runs on alternating current. The peak voltage across the heater is 35.0 V, and the peak current through the heater is 3.80 A. What is the power consumption of the heater?

16. A 1400. Watt heater runs on alternating current at 120. V (RMS). What is the peak current flowing?

17. What is the power of a heater that operates with a peak current of 12.9 A and has a resistance of 2.50 Ω?

18. A 113 Ω heater is dissipating 825 W of power. What must be the peak voltage if it operates on an alternating current source?

**Group Work for 18FGH** Name

**Round your answers to three sig figs (retain five), and show your work.**

**A**

35.0V

3.1 Ω

4.5 Ω

6.7 Ω

1.7 Ω

|  |  |  |
| --- | --- | --- |
| A1 (2.19 A) | A2 (2.19 A) | V1 (3.72 V) |
| V2 (6.78 V) | V3 (24.5 V) | Least power dissipated by a resistor: (the 1.7 ohm: 8.13 W) |

15.0 V

5 Ω

3 Ω

2 Ω

|  |  |  |  |
| --- | --- | --- | --- |
| A1 (15.5 A) | A2 (8.00 A) | A3 (3.00 A) | Greatest power dissipated by a resistor  (the 2 ohm: 112.5 W) |

**B**

45.0 V

4.1 Ω

5.4 Ω

6.3 Ω

4.7 Ω

|  |  |  |
| --- | --- | --- |
| A1 (2.20 A) | A2 (2.20 A) | V1 (20.9 V) |
| V2 (24.1 V) | V3 (10.3 V) | Greatest power dissipated by a resistor:  (the 6.3 ohm: 30.4 W) |

117 V

81Ω

63Ω

45 Ω

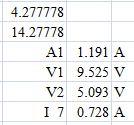
|  |  |  |  |
| --- | --- | --- | --- |
| A1 (5.90 A) | A2 (5.90 A) | A3 (3.30 A) | Least power dissipated by a resistor  (the 81 ohm: 169. W) |

**C**  Find these resistances from the black dot to the black dot:

|  |  |
| --- | --- |
| (80 Ω) | (1.36 Ω) |
| (9 Ω) | (4 Ω) |
| (29 Ω) | (25 Ω) |
| 3 + (8-1 + 8-1)-1 + 5 = 12 Ω (Challenge) | 3+(12-1+(16+8)-1)-1+2 = 13 Ω (Challenge) |
| (6.73 Ω) | Draw a picture of a pretty pony here: |

**Group Work for 18IJ-Single Poppers** Name

Find the readings on the meters:

1

A­1 =

17.0 V

5 Ω

3 Ω

2 Ω

11 Ω

7 Ω

V­1 =

V­2 =

Current through 7 Ω =

2

23.0 V

6 Ω

27 Ω

14 Ω

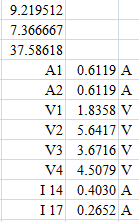
13 Ω

17 Ω

5 Ω

3 Ω

7 Ω

A­1 =

A­2 =

V­1 =

V­2 =

V3 =

V­4 =

Current through 14 Ω =

Current through 17 Ω =

3

3 Ω

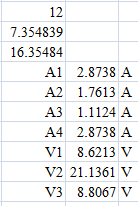
7 Ω

5 Ω

19 Ω

6 Ω

47.0 V



A­1 =

A­2 =

A­3 =

A­4 =

V­1 =

V­2 =

V­3 =

4

52.0 V

4 Ω

6 Ω

7 Ω

2 Ω

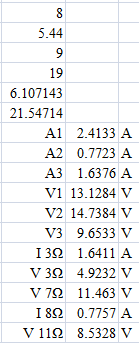
11 Ω

8 Ω

17 Ω

3 Ω

5 Ω

A­1 =

A­2 =

A3 =

V­1 =

V2 =

V­3 =

Current through the 3 Ω

Voltage across the 3 Ω

Voltage across the 7 Ω

Current through the 8 Ω

Voltage across the 11 Ω

**Group Work for 18IJ2-Double Popper’s Penguins** Name

**Round your answers to three sig figs (retain five), and show your work.**

**1**

37.0 V

4 Ω

7 Ω

6 Ω

3 Ω

21 Ω

9 Ω

13 Ω

17 Ω

Find:

A1 =

V1 =

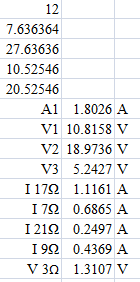
V2 =

V3 =

Find the current through:

17 Ω

7 Ω



21 Ω

9 Ω

Find the Voltage across:

3 Ω

87.0 V

4 Ω

1 Ω

8 Ω

3 Ω

2 Ω

7 Ω

5 Ω

6 Ω

8 Ω

**2**

Find:

A1 =

V1 =

V2 =

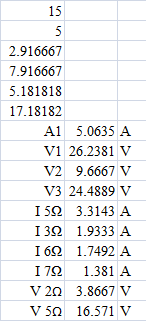
V3 =

Find the current through:

5 Ω

3 Ω

6 Ω



7 Ω

Find the voltage across:

2 Ω

5 Ω

**3**

43.0 V

2 Ω

3 Ω

2 Ω

11 Ω

3 Ω

5 Ω

17 Ω

6 Ω

4 Ω

Find:

A1 =

V1 =

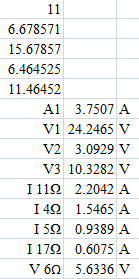
V2 =

V3 =

Find the current through:

11 Ω

4 Ω



5 Ω

17 Ω

Find the Voltage across the:

6 Ω

**4**

31.0 V

1 Ω

2 Ω

3 Ω

9 Ω

7 Ω

11 Ω

4 Ω

3 Ω

Find:

A1 =

V1 =

V2 =

V3 =

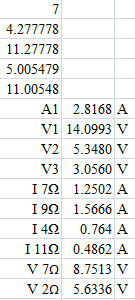
Find the current through:

7 Ω

9 Ω

4 Ω

11 Ω

Find the Voltage across the:

7 Ω

2 Ω

**Group Work for 18L** Name

1

5 Ω

1 Ω

3 Ω

12.0 V

6 Ω

7 Ω

8 Ω

4 Ω

9.0 V

Find the current and direction (up or down) through:

3 Ω

6 Ω

7 Ω

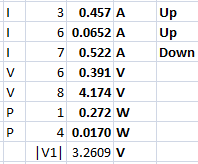
Find the voltage across:

6 Ω

8 Ω

Find power dissipated by:

1 Ω



4 Ω

Find:

|V1| =

2

9 Ω

8 Ω

15.0 V

7 Ω

45.0 V

4 Ω

6 Ω

2 Ω

3 Ω

Find the current and direction (up, down) through:

7 Ω

4 Ω

6 Ω

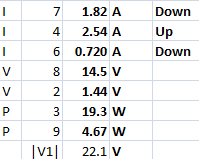
Find the voltage across:

8 Ω

2 Ω

Find power dissipated by:

3 Ω



9 Ω

Find:

|V1| =

3

3 Ω

2 Ω

11.0 V

4 Ω

17.0 V

5 Ω

7 Ω

8 Ω

6 Ω

Find the current and direction (up or down) through:

4 Ω

5 Ω

7 Ω

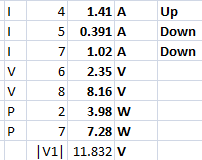
Find the voltage across:

6 Ω

8 Ω

Find power dissipated by:

2 Ω

7 Ω

Find:

|V1| =

4

9 Ω

13 Ω

38.0 V

13.0 V

11 Ω

8 Ω

14 Ω

7 Ω

12 Ω

Find the current and direction (up, down, left, right) through:

11 Ω

14 Ω

8 Ω

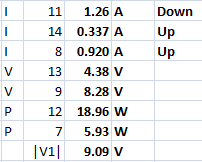
Find the voltage across:

13 Ω

9 Ω

Find power dissipated by:

12 Ω

7 Ω

Find:

|V1| =