Circuits Worksheet

1. What is the terminal voltage of the battery in the circuit shown in the diagram?

ε =6.0V

r=0.20Ω

R=2.5Ω

A. 0.44V B. 5.6V C. 6.0V D. 6.4V E. 8.8V

2. What is the power dissipated in the unknown resistor Rx in the circuit below?

V=5.80V

R1=5.0Ω

Rx

R2=10.0Ω

I2=0.10A

A. 0.30W B. 1.4W C. 1.7W D. 2.0W E. 2.4W

3. Which of the following is the equivalent of a Watt?

A. Joule-second B. Volt/Ohm C. Joule-Ampere D. Newton-Coulomb E. Volt-Ampere

4. Two resistors, R1 and R2, are connected to a 90V battery. The two resistors will dissipate the most power when:

A. connected in parallel B. connected in series

C. they dissipate the same power in parallel as in series D. depends upon the values of R1 and R2

# June 93

5. Which one of the following arrangements of four identical resistors will draw the greatest current when connected to single cell?

A. B.

C. D.

6. For the circuit arrangement shown in the diagram below, what is the power dissipated in resistor R1?

R1

15 V 12 Ω 12 Ω

I = 0.50 A 30 Ω

30 Ω

30 Ω

A. 3.5 W B. 4.0 W C. 7.5 W D. 14 W

### June 94

7. A battery whose emf is 6.0 V is connected to a 2.0Ω resistor. The voltage drop across the 2.0Ω resistor is 5.0V. What is its internal resistance?

A. 0.40Ω B. 1.7Ω C. 2.4Ω D. 2.5Ω

8. A voltmeter is connected across a 3.0Ω resistor in the circuit shown below.

12.0V

R1=6.0Ω R2=6.0Ω

R3=3.0Ω

V

What is the reading on the voltmeter?

A. 4.0V B. 6.0V C. 8.0V D. 12.0V

# June 95

9. In the diagram below which arrows represent conventional current and electron flow in the resistor?

X Y

|  |  |  |
| --- | --- | --- |
|  | Conventional Current | Electron Flow |
| A | X | X |
| B | X | Y |
| C | Y | X |
| D | Y | Y |

10. A flashlight contains two batteries in series with a bulb of resistance 12Ω. Each battery has an emf of 1.5V and an internal resistance of 0.26Ω. What is the potential difference across the bulb?

A. 0.12V B. 1.5V C. 2.9V D. 3.0V

11. Find the current through the battery in the circuit chown below.

12**V**

18Ω

R1

V1=3.0V 9.0Ω

A. 0.033A B. 1.5A C. 2.0A D. 2.5A

12. Calculate the power dissipated by the 8.0Ω resistor in the circuit below.

18V 8.0Ω

16Ω

A. 4.5W B. 6.0W C. 10W D. 41W

### JUNE 96

13. Which of the following instruments will measure the emf of a cell without drawing any current?

A. ammeter B. voltmeter C. ohmmeter D. galvanometre

14. In the following circuit, what current flows through the 4.0 Ω resistor?

12 V

4.0 Ω 6.0 Ω

0.6 Ω

A. 2.4 A B. 2.6 A C. 3.0 A D. 4.0 A

15. In the following circuit, what is the magnitude of the potential difference between **X** and **Y**?

1.5 A V = 12 V

**X Y**

R 4.0 Ω 2.0 Ω

A. 3.0 V B. 6.0 V C. 9.0 V D. 12 V

16. How should an ammeter and a voltmeter be correctly placed in a circuit?

|  |  |  |
| --- | --- | --- |
|  | **Ammetre** | Voltmetre |
| A | parallel | series |
| **B** | parallel | parallel |
| **C** | series | series |
| **D** | series | parallel |

# JUNE 97

17. What is the voltage, V, of the power supply shown I the circuit?

**V**

2.0A 12Ω

8.0Ω

6.0Ω

A. 96V B. 72V C. 52V D. 24V

18. What is the emf of the battery shown?

ξ r=0.50Ω

4.0A

2.50Ω

A. 2.0V B. 8.0V C. 10V D. 12V

19. Two identical resistors connected in series have a total power output of 400W. Assuming V and R remain constant, what would the total power output be when the resistors are re-connected in parallel?

V

V

R

R R

PT=400 W R

A. 200W B. 400W C. 800W D. 1600W

**June 98**

20. In which of the following circuits is the voltmeter placed correctly to measure the terminal voltage of the battery, and the ammeter placed correctly to measure the current through the light bulb( )

A. V B. V

r r

A

A

C. D.

V

A

V

A

## June 1999

21. The circuit shown below includes two ammeters and two voltmeters. Identify the correct placement of these meters.

I

IV

II

III

|  |  |  |
| --- | --- | --- |
|  | AMMETERS | VOLTMETERS |
| A. | I, II | III,IV |
| B. | I,III | II,IV |
| C. | II,IV | I,III |
| D. | III,IV | I,II |

22. A 120V supply is connected to a heater of resistance 15Ω. What must the resistance of another heater be in order to produce the same power output when connected to a 240V supply?

A. 3.8Ω B. 7.5Ω C. 30Ω D. 60Ω

23. What is the voltage of the power supply shown in the diagram?

I1=5.0A R1=3.0Ω P2=12W I3=3.0A

A. 12V B. 19V C. 21V D. 27V

Problems-Problems-Problems-Problems-Problems

# June 93

1. Find the potential difference across the 4.0 Ω resistor in the circuit shown below. (7 marks)

5.0 Ω

120 V

11 Ω

6.0 Ω

4.0 Ω 8.0 Ω

# June 98

6. The circuit shown in the diagram below consists of a 9.00V battery and a 3.50W light bulb.

r

P=3.50W

ξ=9.00V

I=0.400A

a) If a current of 0.400A leaves the battery, what is the internal resistance, r, of the battery? (5 marks)

b)The light bulb is now replaced by a lower resistance (brighter) light bulb. The terminal voltage will now be ( less than before/ the same as before/ greater than before/) ? (1 mark)

c) Using principles of physics, explain your answer to b. (3marks)

# Jan 2004

2. The current through the 8.0Ω resistor shown below is 0.60A. Determine the terminal voltage of the battery. **(7 marks)**

ξ

r=1.7Ω

5.0Ω 7.0Ω 8.0Ω

4.0Ω

6.0Ω

3. Determine the voltage across the 6.0Ω resistor in the circuit shown. Correctly indicate the polarity(+ and – ends) on the diagram. (7 marks)

4.0Ω 8.0Ω

8.0V 6.0Ω

14V

12V

# June 94

5. What is the power dissipated by the 3.0Ω resistor in the circuit below? (7 marks)

V=12V

R1=14Ω R4=24Ω

R3=3.0Ω R5=24Ω

R2=14Ω R6=12Ω

**June 98**

4. Consider the circuit shown: V=85V

a. What is the total resistance?

(3 marks)

b. What is the current through the

88Ω resistor?

(2 marks)

c. What is the power dissipated in the R1=72Ω R4=95Ω

88Ω resistor?

(2 marks) R3=88Ω

R2=140Ω R5=36Ω

5. Determine the emf and terminal voltage of this battery:

0.20Ω

24Ω

12Ω