

## Chapter 23

12. If one of the lamp filaments burns out, the current will stop, and all the lamps will go out.
13.  $V_2 = VR_2 / (R_1 + R_2)$ . As  $R_1$  increases,  $V_2$  will decrease.
14. A) There will be no current in the resistor    B) The current in the resistor will remain the same.
15. If one of the filaments burns out, the resistance and the potential difference across the other lamps will not change; therefore, their currents will remain the same.
16. No, the  $30\ \Omega$  resistors can be used in parallel. Three  $30\ \Omega$  resistors in parallel will give a  $10\ \Omega$  resistance. Two  $30\ \Omega$  resistors in parallel will give a  $15\ \Omega$  resistance.
17. Connect four of the bulbs in series. The voltage drop across each will be  $1.5\ \text{V}$ .
18. A) The lamp with the lower resistance:  $P = IV$  and  $I = V/R$ , so  $P = V^2/R$ . Smaller  $R$  means larger  $P$ .  
B) The lamp with the higher resistance:  $P = IV$  and  $V = IR$ , so  $P = I^2R$ . Larger  $R$  means larger  $P$ .
19. a. series; b. series; c. parallel; d. series; e. parallel; f. series; g. series; h. parallel; i. parallel
20. The 30-A fuse allows more current to flow through the circuit, generating more heat, which can be harmful to devices included in the circuit.
21. A)  $25.0\ \Omega$       B)  $2.00\ \text{A}$       C)  $40.0\ \text{V}; 10.0\ \text{V}$       D)  $80.0\ \text{W}, 20.0\ \text{W}$
22. A)  $60.0\ \Omega$       B)  $6.0\ \text{V}$
23. A)  $1.5\ \text{A}$       B)  $20.0\ \Omega$
24. A)  $230\ \Omega$       B)  $13\ \Omega$       C)  $3.6\ \text{W}$
25. A)  $220\ \Omega$       B)  $66\ \text{W}$       C) increased
26. A)  $0.63\ \text{A}$       B)  $190\ \Omega$       C)  $210\ \Omega$
27. A)  $57\ \text{V}$       B)  $63\ \text{V}$       C)  $17\ \text{W}$       D)  $19\ \text{W}$
28. A)  $8.89\ \Omega$       B)  $4.50\ \text{A}$       C)  $2.50\ \text{A}$
29.  $66\ \Omega$
30.  $200\ \Omega$
31. A)  $52\ \Omega$       B)  $110\ \text{V}$       C)  $2.50\ \text{A}$
32. A)  $2.0\ \text{A}$       B)  $3.0\ \text{A}$       C)  $15\ \text{A}$

33. Yes

34. 22.5 A, 0.750 A

35. 50.6 W, 16.9 W

36. A) refer to manual                      B) 1000 s

37. A) 240  $\Omega$               B) 0.50 A              C) 60 W

38. A) 5.9  $\Omega$               B) 21 A              C) 11 V              D) 110 V; yes