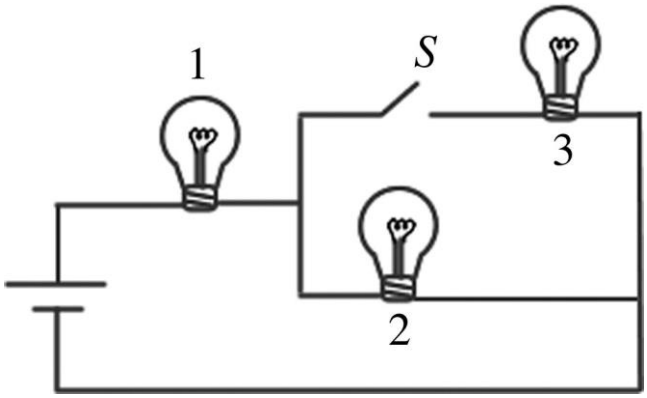
***Physics for Scientists and Engineers, 4e* (Knight)**
Chapter 28 Fundamentals of Circuits

28.1 Conceptual Questions

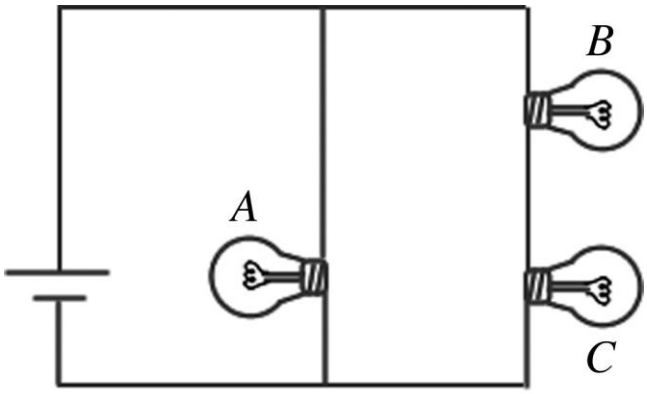
1) As more resistors are added in parallel across a constant voltage source, the power supplied by the source
A) increases.
B) decreases.
C) does not change.
Answer: A
Var: 1

2) The figure shows three identical lightbulbs connected to a battery having a constant voltage across its terminals. What happens to the brightness of lightbulb 1 when the switch *S* is closed?



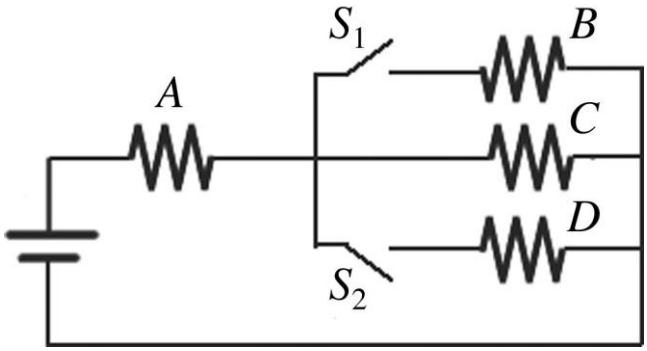
A) The brightness will increase momentarily then return to its previous level.
B) The brightness increases permanently.
C) The brightness will decrease momentarily then return to its previous level.
D) The brightness remains the same as before the switch is closed.
E) The brightness decreases permanently.
Answer: B
Var: 1

3) In the circuit shown in the figure, all the lightbulbs are identical. Which of the following is the correct ranking of the brightness of the bulbs?



A) *B* and *C* have equal brightness, and *A* is the dimmest.
B) *A* and *B* have equal brightness, and *C* is the dimmest.
C) *A* is brightest, *C* is dimmest, and *B* is in between.
D) *A* is the brightest, and *B* and *C* have equal brightness but less than *A*.
E) All three bulbs have the same brightness.
Answer: D
Var: 1

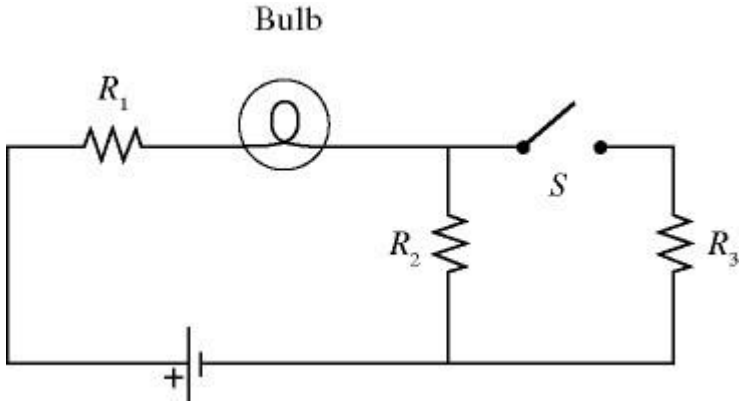
4) In the circuit shown in the figure, four identical resistors labeled *A* to *D* are connected to a battery as shown. S_1 and S_2 are switches. Which of the following actions would result in the GREATEST amount of current through resistor *A*?



A) closing both switches
B) closing S_1 only
C) closing S_2 only
D) leaving both switches open as shown.
Answer: A
Var: 1

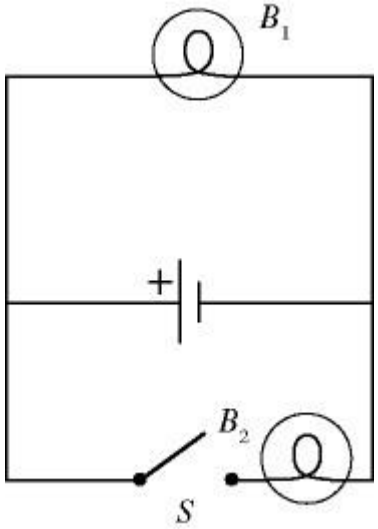
5) A resistor is made out of a long wire having a length L. Each end of the wire is attached to a terminal of a battery providing a constant voltage V_0. A current I flows through the wire. If the wire were cut in half, making two wires of length $L/2$, and both wires were attached to the battery (the end of both wires attached to one terminal, and the other ends attached to the other terminal), what would be the total current flowing through the two wires?
A) $4I$
B) $2I$
C) I
D) $I/2$
E) $I/4$
Answer: A
Var: 1

6) A light bulb is connected in the circuit shown in the figure with the switch S open. All the connecting leads have no appreciable resistance and the battery has no internal resistance. When we close the switch, which statements below accurately describe the behavior of the circuit? (There may be more than one correct choice.)



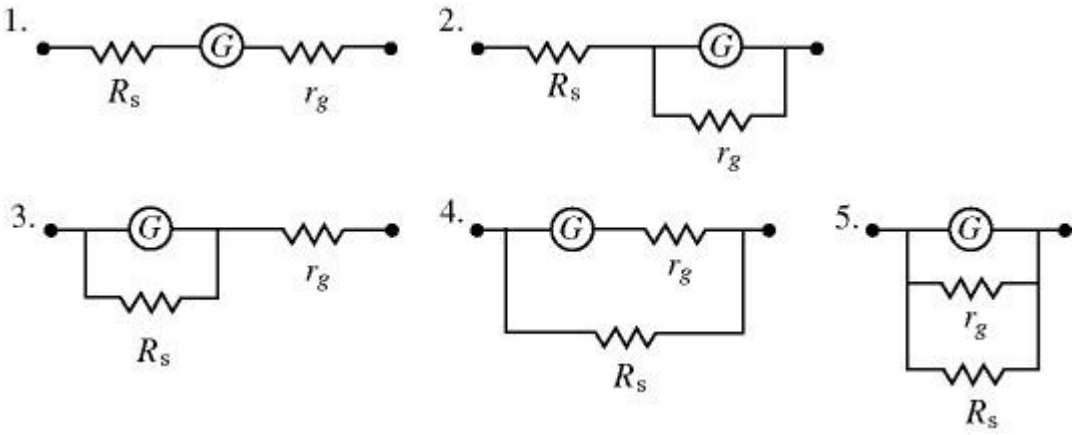
A) The brightness of the bulb will increase.
B) The brightness of the bulb will decrease.
C) The brightness of the bulb will not change.
D) The potential drop across R_2 will decrease.
E) The potential drop across R_2 will not change.
Answer: A, D
Var: 1

7) Two light bulbs, B_1 and B_2, are connected to a battery having appreciable internal resistance as shown in the figure. What happens to the brightness of bulb B_1 when we close the switch S?



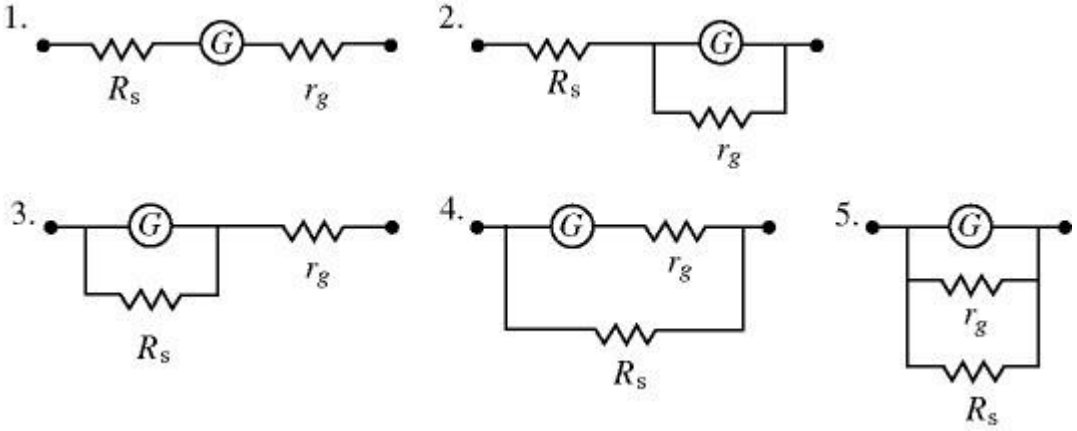
A) The brightness of B_1 increases permanently.
B) The brightness of B_1 decreases permanently.
C) The brightness of B_1 does not change.
D) The brightness of B_1 increases temporarily but gradually decreases back to its original brightness.
E) The brightness of B_1 decreases temporarily but gradually increases back to its original brightness.
Answer: B
Var: 1

8) A galvanometer *G* has an internal resistance r_g. An AMMETER is constructed by incorporating the galvanometer and an additional resistance R_S. Which one of the figures below is the most appropriate circuit diagram for the ammeter?



A) 1
B) 2
C) 3
D) 4
E) 5
Answer: D
Var: 1

9) A galvanometer *G* has an internal resistance r_g. A VOLTMETER is constructed by incorporating the galvanometer and an additional resistance R_S. Which one of the figures below is the most appropriate circuit diagram for the voltmeter?

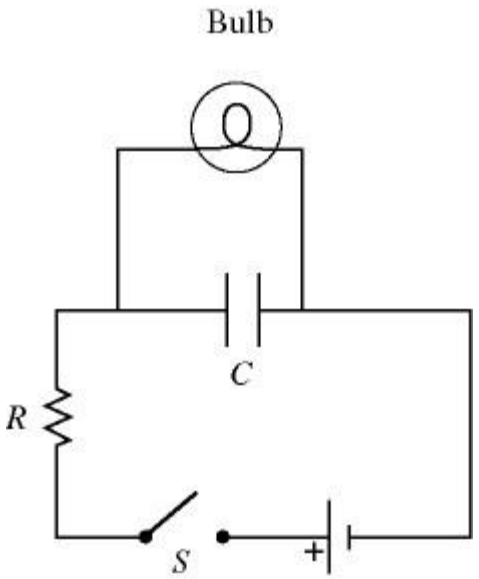


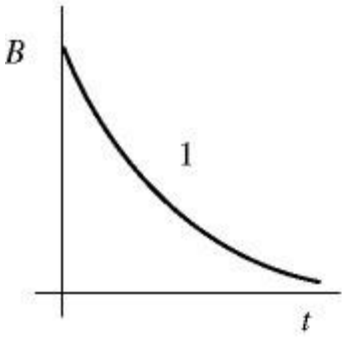
A) 1
B) 2
C) 3
D) 4
E) 5
Answer: A
Var: 1

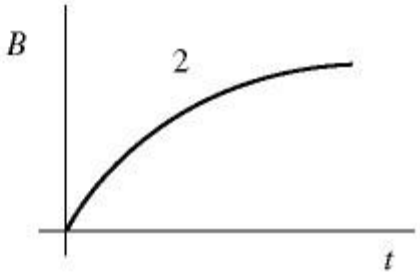
10) A resistor and a capacitor are connected in series across an ideal battery having a constant voltage across its terminals. At the moment contact is made with the battery
(a) the voltage across the capacitor is
A) equal to the battery's terminal voltage.
B) less than the battery's terminal voltage, but greater than zero.
C) equal to the battery's terminal voltage.
D) zero.
(b) the voltage across the resistor is
A) equal to the battery's terminal voltage.
B) less than the battery's terminal voltage, but greater than zero.
C) equal to the battery's terminal voltage.
D) zero.
Answer: (a) D (b) C
Var: 1

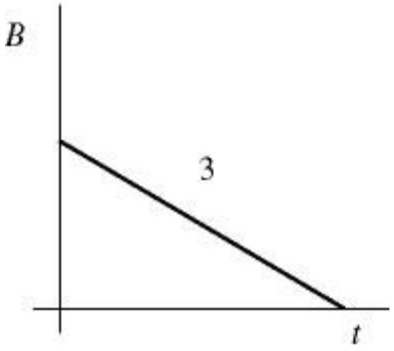
11) An *RC* circuit is connected across an ideal DC voltage source through an open switch. The switch is closed at time $t = 0$ s. Which of the following statements regarding the circuit are correct? (There may be more than one correct choice.)
A) The capacitor charges to its maximum value in one time constant and the current is zero at that time.
B) The potential difference across the resistor and the potential difference across the capacitor are always equal.
C) The potential difference across the resistor is always greater than the potential difference across the capacitor.
D) The potential difference across the capacitor is always greater than the potential difference across the resistor
E) Once the capacitor is essentially fully charged, there is no appreciable current in the circuit.
Answer: E
Var: 1

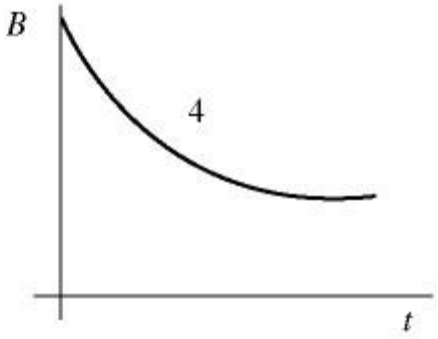
12) A light bulb is connected in the circuit shown in the figure with the switch *S* open and the capacitor uncharged. The battery has no appreciable internal resistance. Which one of the following graphs best describes the brightness *B* of the bulb as a function of time *t* after closing the switch?

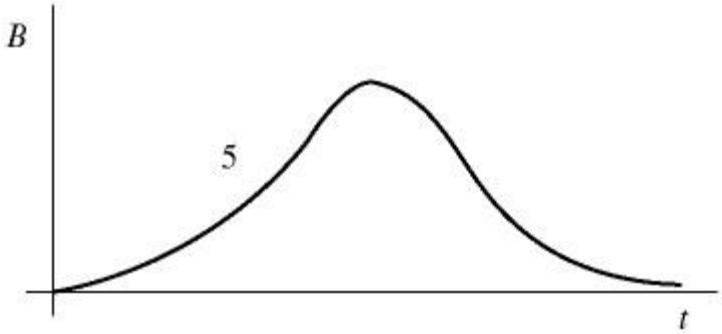












A) 1
B) 2
C) 3
D) 4
E) 5
Answer: B
Var: 1

28.2 Problems

1) The power rating of a 400-Ω resistor is 0.800 W.
(a) What is the maximum voltage that can be applied across this resistor without damaging it?
(b) What is the maximum current this resistor can draw without damaging it?
Answer: (a) 17.9 V (b) 44.7 mA
Var: 1

2) A 110-V hair dryer is rated at 1200 W. What current will it draw when operating from a 110-V electrical outlet?
A) 90 mA
B) 1.0 A
C) 5.0 A
D) 11 A
E) 14 A
Answer: D
Var: 1

3) A light bulb is connected to a 110-V source. What is the resistance of this bulb if it is a 100-W bulb?
A) 100 Ω
B) 8.0 mΩ
C) 6.0 mΩ
D) 120 Ω
E) 240 Ω
Answer: D
Var: 1

4) A certain electric furnace consumes 24 kW when it is connected to a 240-V line. What is the resistance of the furnace?
A) 1.0 kΩ
B) 10 Ω
C) 2.4 Ω
D) 0.42 Ω
E) 100 Ω
Answer: C
Var: 1

5) A 1500-W heater is connected to a 120-V line. How much heat energy does it produce in 2.0 hours?
A) 1.5 kJ
B) 3.0 kJ
C) 0.18 MJ
D) 11 MJ
E) 18 MJ
Answer: D
Var: 1

6) The resistivity of gold is $2.44 \times 10^{-8}\ \Omega \cdot m$ at room temperature. A gold wire that is 1.8 mm in diameter and 11 cm long carries a current of 170 mA. How much power is dissipated in the wire?
A) 0.030 mW
B) 0.0076 mW
C) 0.013 mW
D) 0.019 mW
E) 0.025 mW
Answer: A
Var: 1

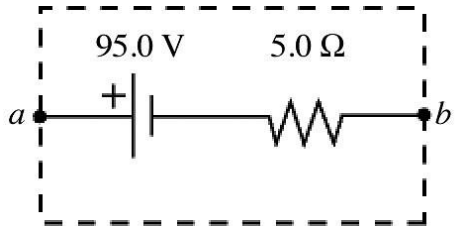
7) A 400-W computer (including the monitor) is turned on for 8.0 hours per day. If electricity costs 10¢ per kWh, how much does it cost to run the computer annually for a typical 365-day year?
A) $120
B) $1200
C) $15
D) $17
E) $150
Answer: A
Var: 1

8) The voltage and power ratings of a particular light bulb, which are its normal operating values, are 110 V and 60 W. Assume the resistance of the filament of the bulb is constant and is independent of operating conditions. If the light bulb is operated with a current that is 50% of the current rating of the bulb, what is the actual power drawn by the bulb?
A) 10 W
B) 15 W
C) 20 W
D) 25 W
E) 30 W
Answer: B
Var: 1

9) The voltage and power ratings of a particular light bulb, which are its normal operating values, are 110 V and 60 W. Assume the resistance of the filament of the bulb is constant and is independent of operating conditions. If the light bulb is operated at a reduced voltage and the power drawn by the bulb is 36 W, what is the operating voltage of the bulb?
A) 66 V
B) 72 V
C) 78 V
D) 85 V
E) 90 V
Answer: D
Var: 1

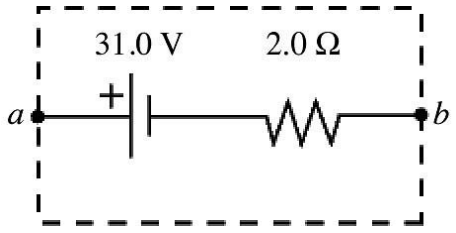
10) The heater element of a particular 120-V toaster is a 8.9-m length of nichrome wire, whose diameter is 0.86 mm. The resistivity of nichrome at the operating temperature of the toaster is $1.3 \times 10^{-6}\ \Omega \cdot \text{m}$. If the toaster is operated at a voltage of 120 V, how much power does it draw?
A) 720 W
B) 700 W
C) 750 W
D) 770 W
E) 800 W
Answer: A
Var: 50+

11) The emf and the internal resistance of a battery are as shown in the figure. If a current of 8.3 A is drawn from the battery when a resistor *R* is connected across the terminals *ab* of the battery, what is the power dissipated by the resistor *R*?



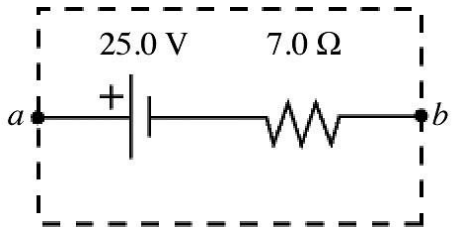
A) 440 W
B) 700 W
C) 620 W
D) 530 W
E) 790 W
Answer: A
Var: 1

12) The emf and the internal resistance of a battery are as shown in the figure. When the terminal voltage V_{ab} is equal to 17.4 V, what is the current through the battery, including its direction?



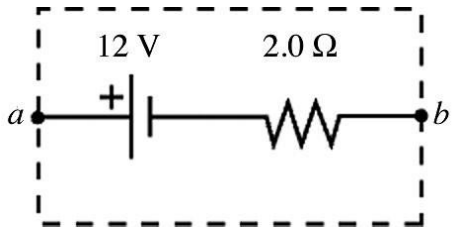
A) 6.8 A, from *b* to *a*
B) 8.7 A, from *b* to *a*
C) 6.8 A, from *a* to *b*
D) 8.7 A, from *a* to *b*
E) 16 A, from *b* to *a*
Answer: A
Var: 1

13) The emf and the internal resistance of a battery are shown in the figure. If a current of 7.8 A is established through the battery from *b* to *a*, what is the terminal voltage V_{ab} of the battery?



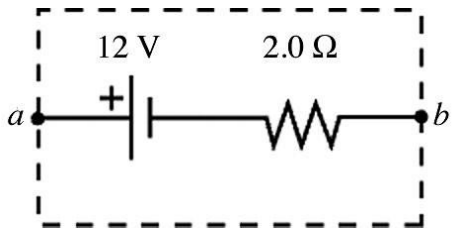
A) -30 V
B) 80 V
C) 30 V
D) -80 V
E) zero
Answer: A
Var: 1

14) In the figure a current of 6.0 A is drawn from the battery. What is the terminal voltage V_{ab} of the battery?



A) 0.00 V
B) +12 V
C) +24 V
D) -12 V
E) -24 V
Answer: A
Var: 1

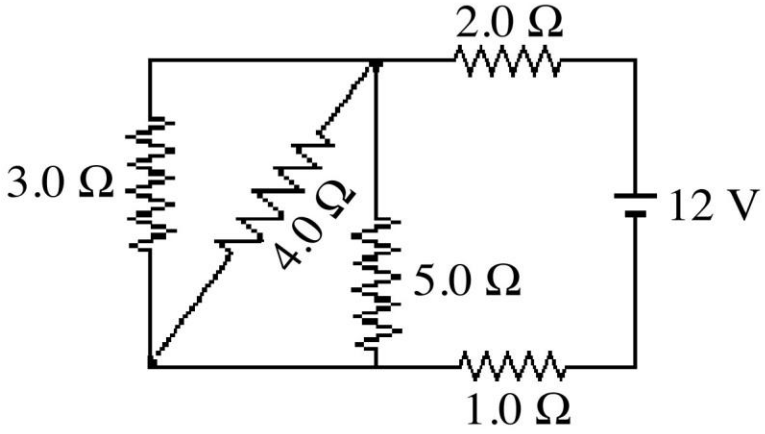
15) In the figure, when the terminal voltage V_{ab} of the battery is equal to 20 V, how much current passes through the battery, including its direction?



A) 4 A, from *a* to *b*
B) 5 A, from *a* to *b*
C) 6 A, from *a* to *b*
D) 4 A, from *b* to *a*
E) 5 A, from *b* to *a*
Answer: A
Var: 1

16) A 5.0-Ω resistor and a 9.0-Ω resistor are connected in parallel. A 4.0-Ω resistor is then connected in series with this parallel combination. An ideal 6.0-V battery is then connected across the series-parallel combination of the three resistors. What is the current through
(a) the 4.0-Ω resistor?
(b) the 5.0-Ω resistor?
(c) the 9.0-Ω resistor?
Answer: (a) 0.83 A (b) 0.53 A (c) 0.30 A
Var: 1

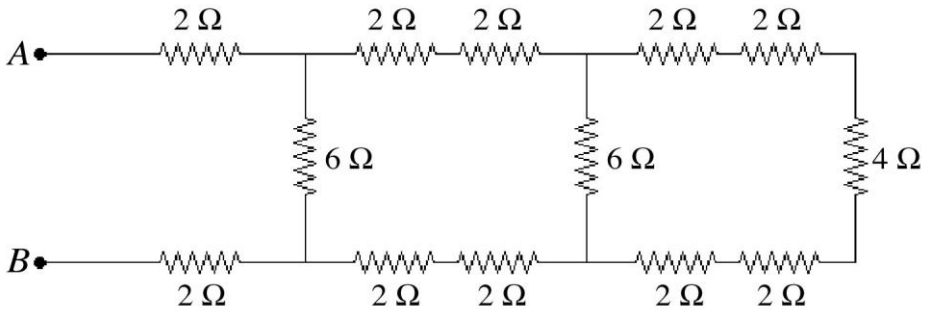
17) For the circuit shown in the figure, determine the current in
(a) the 1.0-Ω resistor.
(b) the 3.0-Ω resistor.
(c) the 4.0-Ω resistor.



Answer: (a) 2.8 A (b) 1.2 A (c) 0.90 A
Var: 1

18) A 4.00-Ω resistor, an 8.00-Ω resistor, and a 24.0-Ω resistor are connected together.
(a) What is the maximum resistance that can be produced using all three resistors?
(b) What is the minimum resistance that can be produced using all three resistors?
(c) How would you connect these three resistors to obtain a resistance of 10.0 Ω?
(d) How would you connect these three resistors to obtain a resistance of 8.00 Ω?
Answer:
(a) 36.0 Ω (b) 2.40 Ω
(c) Connect the 8.00-Ω and 24.0-Ω resistors in parallel and then connect this combination in series with the 4.00-Ω resistor.
(d) Connect the 4.00-Ω and 8.00-Ω resistors in series and then connect this combination in parallel with the 24.0-Ω resistor.
Var: 1

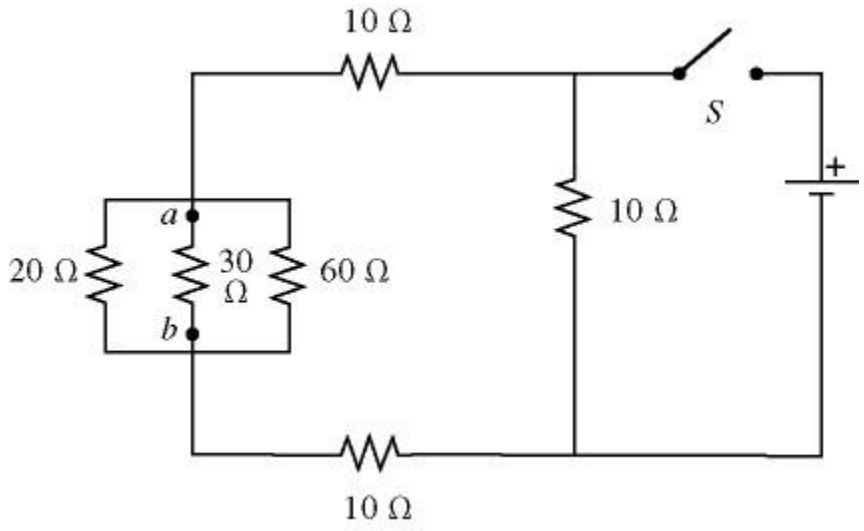
19) Thirteen resistors are connected across points *A* and *B* as shown in the figure. If all the resistors are accurate to 2 significant figures, what is the equivalent resistance between points *A* and *B*?



A) 4.0 Ω
B) 6.0 Ω
C) 8.0 Ω
D) 10 Ω
E) 12 Ω
Answer: C
Var: 1

20) Two unknown resistors are connected together. When they are connected in series their equivalent resistance is 15 Ω. When they are connected in parallel, their equivalent resistance is 3.3 Ω. What are the resistances of these resistors?
Answer: 4.9 Ω and 10 Ω
Var: 1

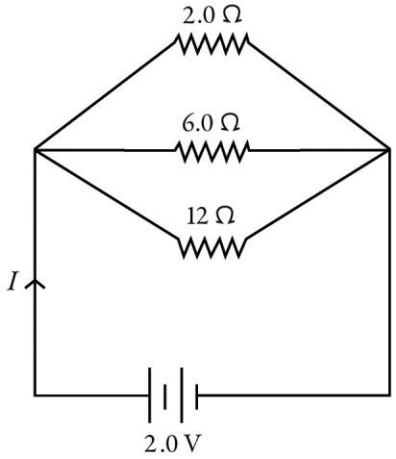
21) In the circuit shown in the figure, an ideal ohmmeter is connected across *ab* with the switch *S* open. All the connecting leads have negligible resistance. The reading of the ohmmeter will be closest to



A) 7.5 Ω.
B) 10 Ω.
C) 30 Ω.
D) 40 Ω.
E) 60 Ω.
Answer: A
Var: 1

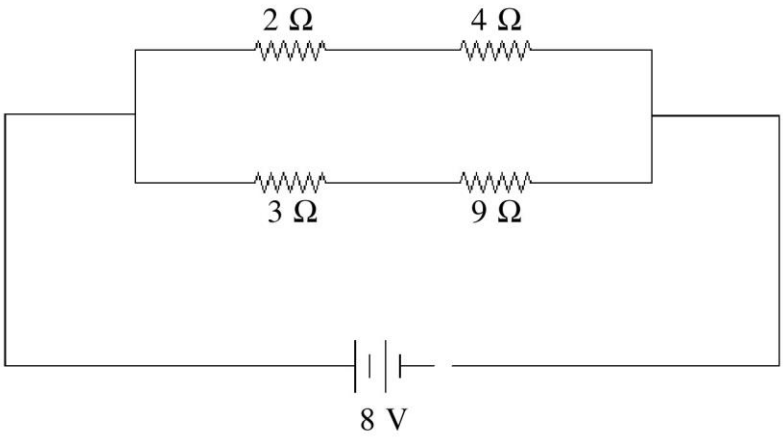
22) Three resistors having resistances of 4.0 Ω, 6.0 Ω, and 10.0 Ω are connected in parallel. If the combination is connected in series with an ideal 12-V battery and a 2.0-Ω resistor, what is the current through the 10.0-Ω resistor?
A) 0.59 A
B) 2.7 A
C) 6.4 A
D) 11.2 A
E) 16 A
Answer: A
Var: 1

23) Three resistors are connected across an ideal 2.0-V DC battery as shown in the figure.
(a) At what rate does the battery supply energy to the resistors?
(b) At what rate is heat produced in the 6.0-Ω resistor?



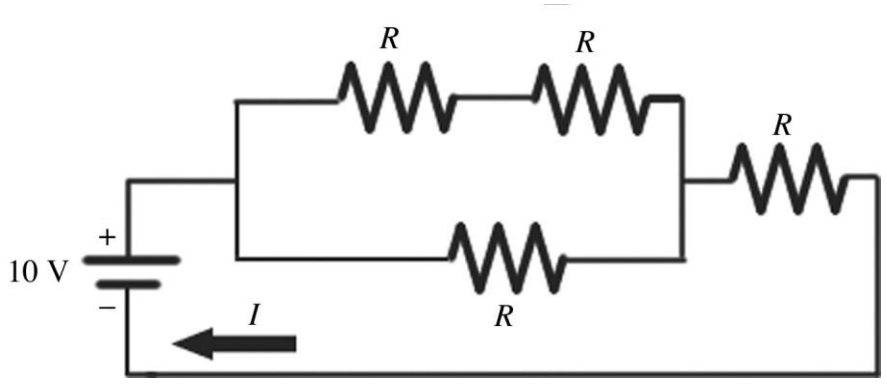
Answer: (a) 3.0 W (b) 0.67 W
Var: 1

24) Four resistors are connected across an 8-V DC battery as shown in the figure. The current through the 9-Ω resistor is closest to



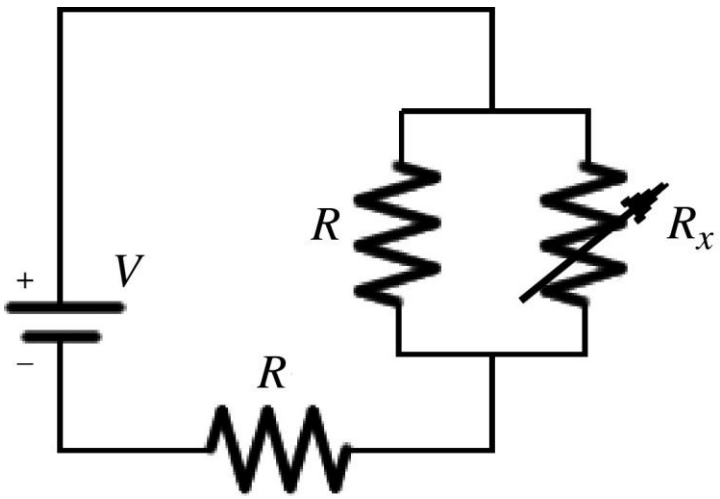
A) 1 A.
B) 0.7 A.
C) 0.5 A.
D) 0.9 A.
E) 2 A.
Answer: B
Var: 1

25) When four identical resistors are connected to an ideal battery of voltage V = 10 V as shown in the figure, the current I is equal to 0.20 A. What is the value of the resistance R of the resistors?



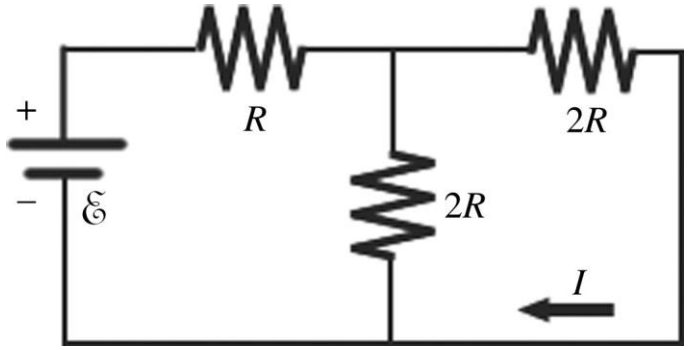
A) 20 Ω
B) 40 Ω
C) 30 Ω
D) 50 Ω
E) 10 Ω
Answer: C
Var: 1

26) Two identical resistors of resistance R = 24 Ω and a variable resistor R_X are connected to an ideal battery of voltage V as shown in the figure. What should be the value of the variable resistance R_X to make the voltage across the two parallel resistors equal to $\frac{V}{5}$.



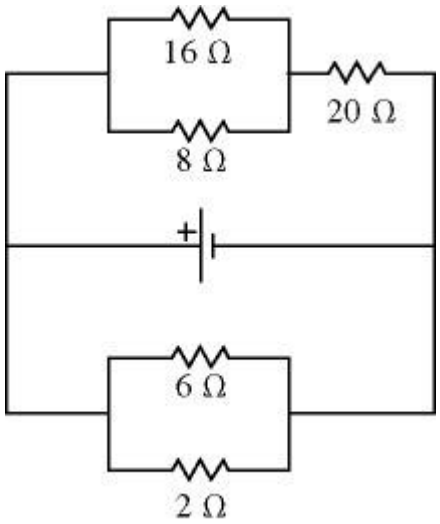
A) 4.0 Ω
B) 24 Ω
C) 8.0 Ω
D) 16 Ω
E) 40 Ω
Answer: C
Var: 1

27) For the circuit shown in the figure, $I = 0.50$ A and $R = 12\ \Omega$. What is the value of the emf ε?



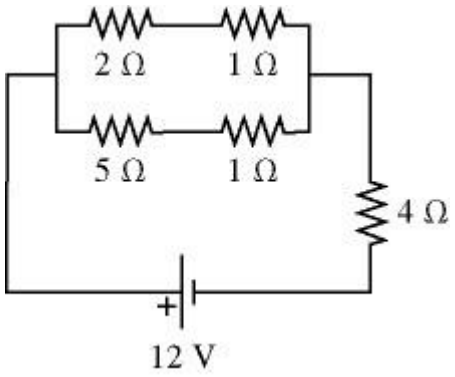
A) 18 V
B) 24 V
C) 6.0 V
D) 12 V
E) 48 V
Answer: B
Var: 1

28) For the circuit shown in the figure, the current in the 8-Ω resistor is 0.50 A, and all quantities are accurate to 2 significant figures. What is the current in the 2-Ω resistor?



A) 2.25 A
B) 0.75 A
C) 4.5 A
D) 9.5 A
E) 6.4 A
Answer: D
Var: 1

29) For the circuit shown in the figure, all quantities are accurate to 3 significant figures. What is the power dissipated in the 2-Ω resistor?



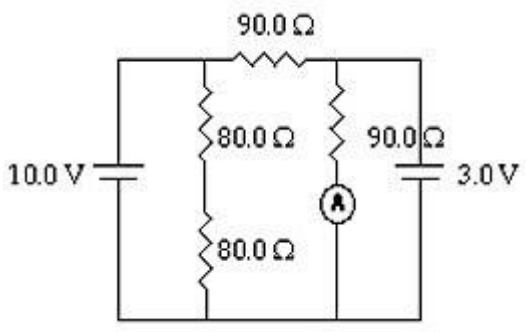
A) 5.33 W
B) 8.0 W
C) 6.67 W
D) 2.67 W
E) 3.56 W
Answer: E
Var: 1

30) When a 20.0-ohm resistor is connected across the terminals of a 12.0-V battery, the voltage across the terminals of the battery falls by 0.300 V. What is the internal resistance of this battery?
A) 3.60 Ω
B) 1.56 Ω
C) 0.98 Ω
D) 0.30 Ω
E) 0.51 Ω
Answer: E
Var: 1

31) What is the maximum current that can be drawn from a 1.50-V battery with an internal resistance of 0.30 ohm?
A) 2.5 A
B) 5.0 A
C) 0.45 A
D) 0.20 A
E) 4.5 A
Answer: B
Var: 1

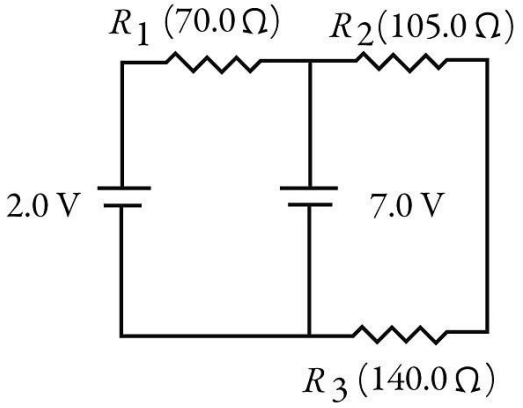
32) When a 100-Ω resistor is connected across the terminals of a battery of emf ε and internal resistance r, the battery delivers 0.794 W of power to the 100-Ω resistor. When the 100-Ω resistor is replaced by a 200-Ω resistor, the battery delivers 0.401 W of power to the 200-Ω resistor. What are the emf and internal resistance of the battery?
A) ε = 10.0 V, r = 5.02 Ω
B) ε = 4.50 V, r = 4.00 Ω
C) ε = 9.00 V, r = 2.04 Ω
D) ε = 9.00 V, r = 1.01 Ω
E) ε = 12.0 V, r = 6.00 Ω
Answer: D
Var: 1

33) For the circuit shown in the figure, what current does the ideal ammeter read?



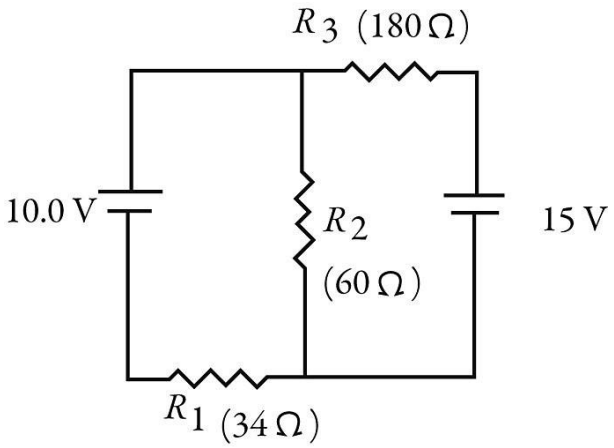
A) 0.033 A
B) 0.078 A
C) 0.23 A
D) 0.12 A
Answer: A
Var: 1

34) For the circuit shown in the figure, what is the current through resistor R_1?



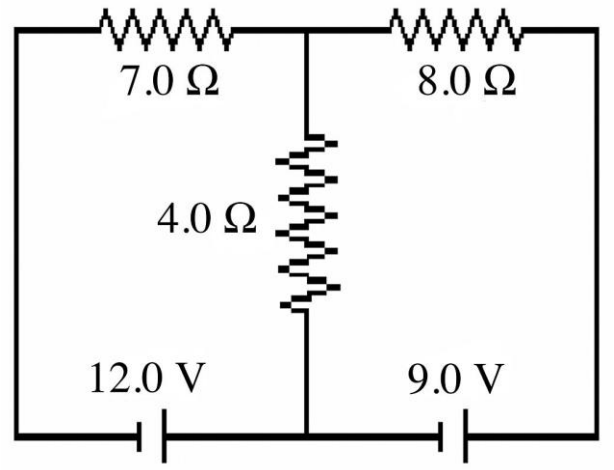
A) 0.071 A
B) 0.13 A
C) 0.029 A
D) 0.016 A
Answer: A
Var: 1

35) For the circuit shown in the figure, what is the current through resistor R_3?



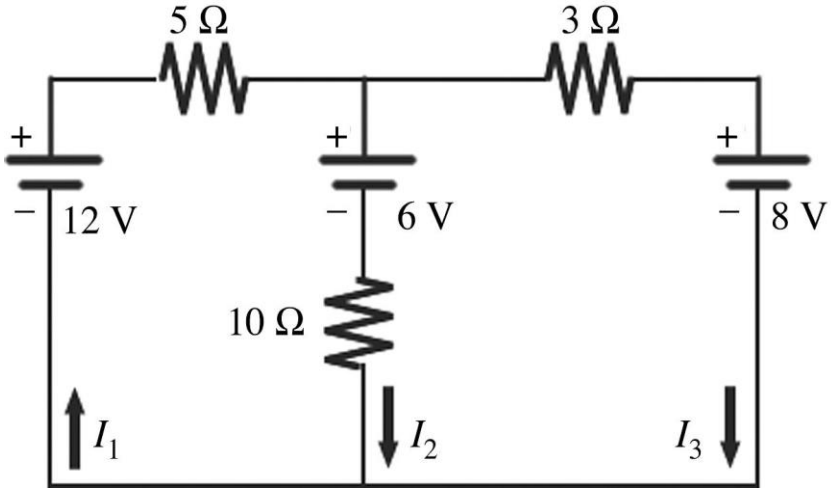
A) 0.043 A
B) 1.5 A
C) 0.028 A
D) 0.086 A
Answer: A
Var: 1

36) For the circuit shown in the figure, determine the current in
(a) the 7.0-Ω resistor.
(b) the 8.0-Ω resistor.
(c) the 4.0-Ω resistor.



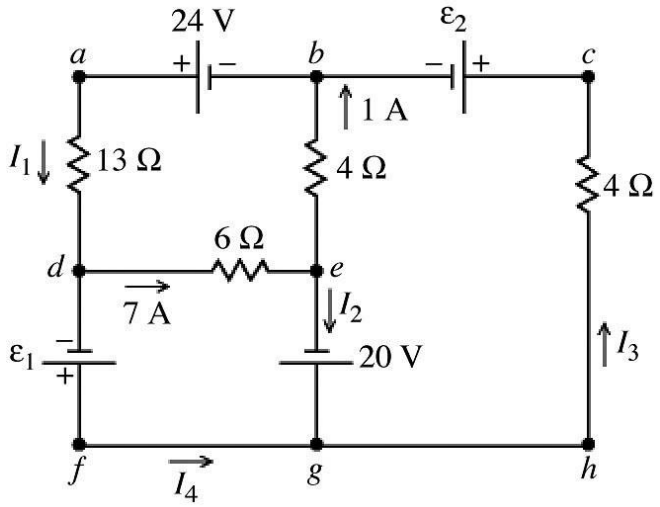
Answer: (a) 1.6 A (b) 1.3 A (c) 0.28 A
Var: 1

37) For the circuit shown in the figure, all quantities are accurate to 2 significant figures. What is the value of the current I_1?



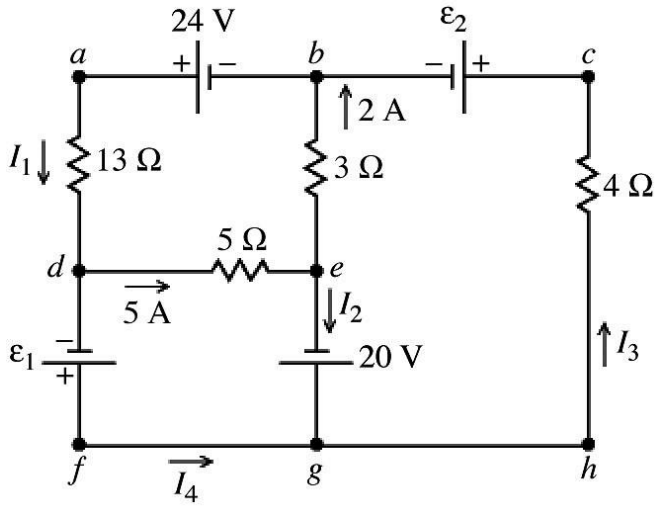
A) 0.32 A
B) 0.11 A
C) 0.29 A
D) 0.61 A
E) 0.89 A
Answer: D
Var: 1

38) A multiloop circuit is shown in the figure. It is not necessary to solve the entire circuit. The current I_2 is closest to



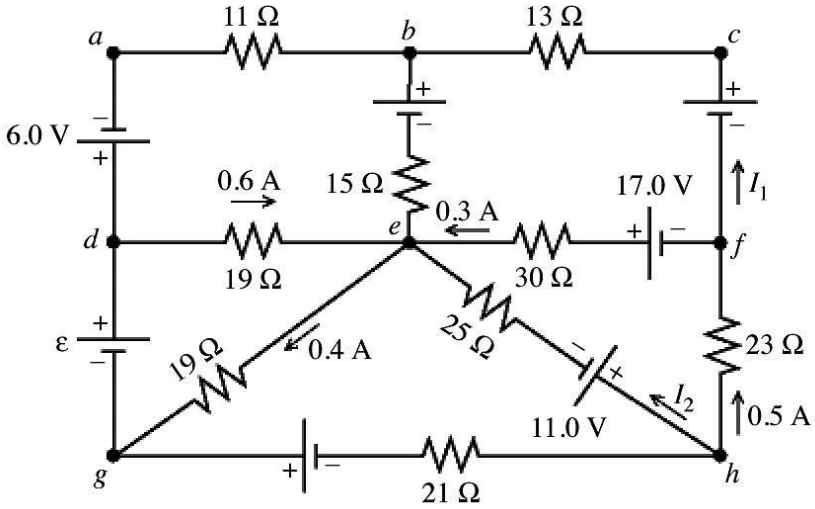
A) -6 A.
B) 6 A.
C) 8 A.
D) -8 A.
E) zero.
Answer: A
Var: 1

39) A multiloop circuit is shown in the figure. It is not necessary to solve the entire circuit. Compared to the polarity shown in the figure, the emf ε_1 is closest to



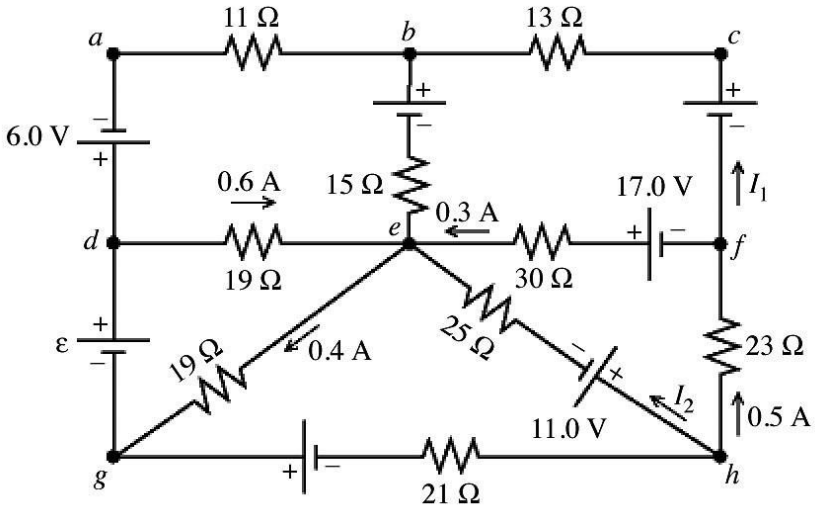
A) -5 V.
B) 5 V.
C) 45 V.
D) 51 V.
E) -51 V.
Answer: A
Var: 1

40) A multiloop circuit is shown in the figure. Some circuit quantities are not labeled. It is not necessary to solve the entire circuit. The current I_1 is closest to



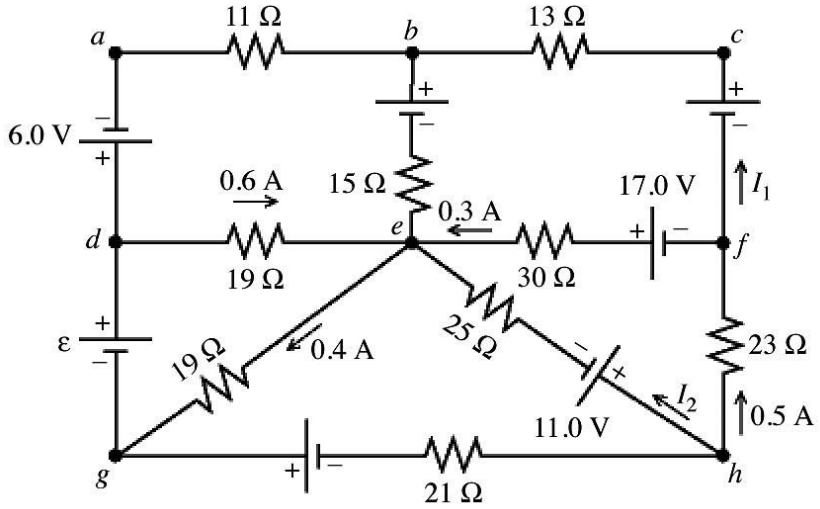
A) zero.
B) +0.2 A.
C) +0.4 A.
D) -0.2 A.
E) -0.4 A.
Answer: B
Var: 1

41) A multiloop circuit is shown in the figure. Some circuit quantities are not labeled. It is not necessary to solve the entire circuit. The emf ε is closest to



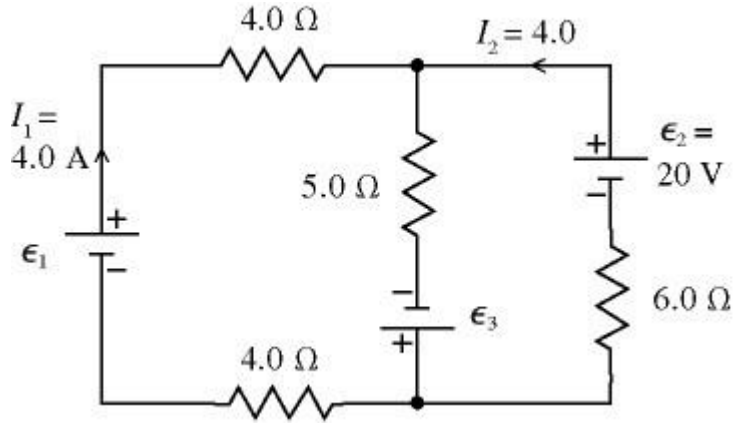
A) +3 V.
B) +19 V.
C) -3 V.
D) -10 V.
E) -1 V.
Answer: B
Var: 1

42) A multiloop circuit is shown in the figure. Some circuit quantities are not labeled. It is not necessary to solve the entire circuit. The current I_2 is closest to



A) +0.1 A.
B) +0.3 A.
C) +0.5 A.
D) -0.1 A.
E) -0.3 A.
Answer: E
Var: 1

43) Consider the circuit shown in the figure. Note that two currents are shown. Calculate the emfs ε_1 and ε_3.



Answer: ε_1 = 28 V, ε_3 = 44 V
Var: 1

44) A galvanometer coil having a resistance of 20 Ω and a full-scale deflection at 1.0 mA is connected in series with a 4980 Ω resistance to build a voltmeter. What is the maximum voltage that this voltmeter can read?
A) 3.0 V
B) 1.0 V
C) 50 V
D) 5.0 V
E) 10 V
Answer: D
Var: 1

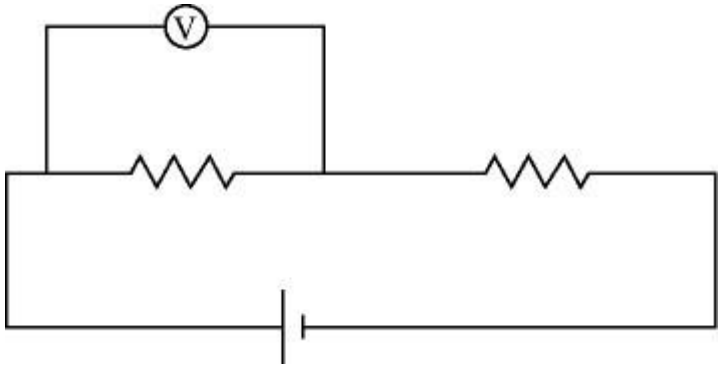
45) A galvanometer has an internal resistance of 100 Ω and deflects full-scale at 2.00 mA. What size resistor should be added to the galvanometer to convert it to a milliammeter capable of reading up to 4.00 mA, and how should this resistor be connected to the galvanometer?
A) 50.0 Ω in series with the galvanometer
B) 50.0 Ω in parallel with the galvanometer
C) 75.0 Ω in parallel with the galvanometer
D) 100 Ω in series with the galvanometer
E) 100 Ω in parallel with the galvanometer
Answer: E
Var: 1

46) A galvanometer has a coil with a resistance of 24.0 Ω, and a current of 180 μA causes it to deflect full scale. If this galvanometer is to be used to construct an ammeter that can read up to 10.0 A, what shunt resistor is required?
A) 123 μΩ
B) 234 μΩ
C) 342 μΩ
D) 432 μΩ
E) 423 μΩ
Answer: D
Var: 1

47) A galvanometer has an internal resistance of 100 Ω and deflects full-scale at a current of 2.00 mA. What size resistor should be added to it to convert it to a millivoltmeter capable of reading up to 400 mV, and how should this resistor be connected to the galvanometer?
A) 50.0 Ω in series with the galvanometer
B) 50.0 Ω in parallel with the galvanometer
C) 75.0 Ω in parallel with the galvanometer
D) 100 Ω in series with the galvanometer
E) 100 Ω in parallel with the galvanometer
Answer: D
Var: 1

48) A galvanometer with a resistance of 40.0 Ω deflects full scale at a current of 2.0 mA. What resistance should be used with this galvanometer in order to construct a voltmeter that can read a maximum of 50 V?
A) 25 kΩ
B) 27 kΩ
C) 29 kΩ
D) 31 kΩ
E) 35 kΩ
Answer: A
Var: 1

49) In the circuit shown in the figure, two 360.0-Ω resistors are connected in series with an ideal source of emf. A voltmeter with internal resistance of 6350 Ω is connected across one of the resistors and reads 3.23 V. Find the emf of the source.



Answer: 6.64 V
Var: 1

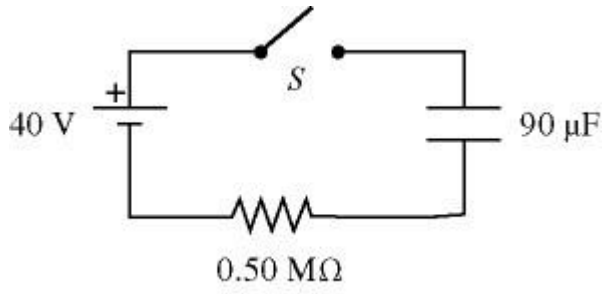
50) A 6.0-μF capacitor is connected in series with a 5.0 MΩ resistor, and this combination is connected across an ideal 15-V DC battery. What is the current in the circuit when the capacitor has reached 20% of its maximum charge?
A) 6.5 μA
B) 2.4 μA
C) 1.3 μA
D) 4.7 μA
E) 9.1 μA
Answer: B
Var: 5

51) A 4.0-mF capacitor is discharged through a 4.0-kΩ resistor. How long will it take for the capacitor to lose half its initial stored energy?
A) 9.2 s
B) 2.7 s
C) 10.2 s
D) 5.5 s
E) 1.6 s
Answer: D
Var: 5

52) An uncharged 1.0-μF capacitor is connected in series with a 23-kΩ resistor, an ideal 7.0-V battery, and an open switch. What is the voltage across the capacitor 11 ms after closing the switch?
A) 2.7 V
B) 1.6 V
C) 2.6 V
D) 0.62 V
Answer: A
Var: 50+

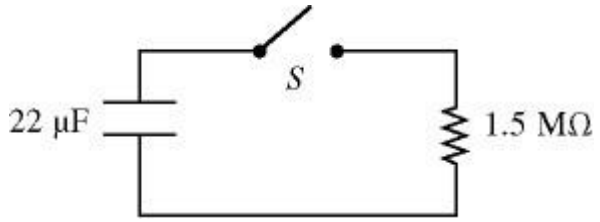
53) A 4.0-μF capacitor that is initially uncharged is connected in series with a 4.0-kΩ resistor and an ideal 17.0-V battery. How much energy is stored in the capacitor 17 ms after the battery has been connected?
A) 250,000 nJ
B) 15,000 kJ
C) 25 μJ
D) 890 nJ
Answer: A
Var: 1

54) For the circuit shown in the figure, the switch *S* is initially open and the capacitor is uncharged. The switch is then closed at time $t = 0$. How many seconds after closing the switch will the energy stored in the capacitor be equal to 50.2 mJ?



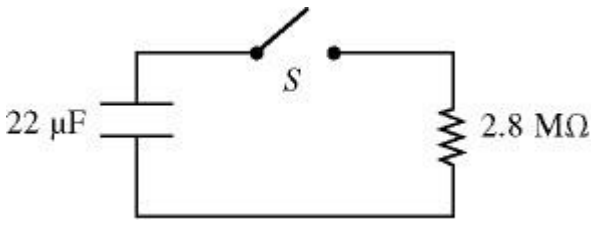
A) 81 s
B) 65 s
C) 97 s
D) 110 s
E) 130 s
Answer: A
Var: 1

55) For the circuit shown in the figure, the switch *S* is initially open and the capacitor voltage is 80 V. The switch is then closed at time *t* = 0. What is the charge on the capacitor when the current in the circuit is 33 μA?



A) 1100 μC
B) 1000 μC
C) 960 μC
D) 890 μC
E) 830 μC
Answer: A
Var: 1

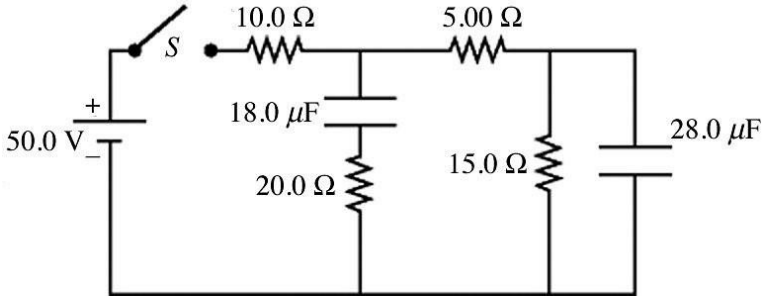
56) For the circuit shown in the figure, the switch *S* is initially open and the capacitor voltage is 80 V. The switch is then closed at time *t* = 0. How long after closing the switch will the current in the resistor be 7.0 μA?



A) 87 s
B) 95 s
C) 78 s
D) 69 s
E) 61 s
Answer: A
Var: 1

57) An uncharged 30.0-μF capacitor is connected in series with a 25.0-Ω resistor, a DC battery, and an open switch. The battery has an internal resistance of 10.0 Ω and the open-circuit voltage across its terminals is 50.0 V. The leads have no appreciable resistance. At time t = 0, the switch is suddenly closed.
(a) What is the maximum current through the 25.0-Ω resistor and when does it occur (immediately after closing the switch or after the switch has been closed for a long time)?
(b) What is the maximum charge that the capacitor receives?
(c) When the current in the circuit is 0.850 A, how much charge is on the plates of the capacitor?
Answer: (a) 1.43 A, immediately after closing the switch
(b) 1500 μC (c) 608 μC
Var: 1

58) For the circuit shown in the figure, the capacitors are all initially uncharged, the connecting leads have no resistance, the battery has no appreciable internal resistance, and the switch *S* is originally open.



(a) Just after closing the switch *S*, what is the current in the 15.0-Ω resistor?
A) 0.00 A
B) 1.67 A
C) 2.50 A
D) 3.33 A
E) 5.00 A
(b) After the switch *S* has been closed for a very long time, what is the potential difference across the 28.0-μF capacitor?
A) 0.00 V
B) 25.0 V
C) 3.33 V
D) 37.5 V
E) 50.0 V
Answer: (a) A(b) B
Var: 1