TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

1) The unit of measurement for conductance is the Coulomb. 1) _____

2) Kilo equals 1,000 times the base unit. 2) _____

3) Inductors store energy in an electrostatic field. 3) _____

4) An electronic device which stores an electric charge is known as an inductor. 4) _____

5) The symbol μ is an abbreviation for 10^{-6} or micro. 5) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

6) Which of the following are common applications of electronics? 6) _____

A) Computers
B) Automation
C) Communications systems
D) Consumer products
E) All of the above

7) The symbol for Current is: 7) _____

A) **I** B) **A** C) **V** D) **C**

8) The unit of measurement for current is the: 8) _____

A) Volt B) Ohm C) Ampere D) Watt

9) The symbol for voltage is: 9) _____

A) **C** B) **A** C) **R** D) **V**

10) The unit of measurement for voltage is the: 10) _____

A) Volt B) Ampere C) Ohm D D) Watt

11) The symbol for a resistor is: 11) _____

A) **A** B) **V** C) **C** D) **R**

12) The shortcut symbol for Ohms is: 12) _____

A) Ω B) α C) δ D) .

13) The unit of measurement for resistance is the: 13) _____

A) Watt B) Ampere C) Volt D) Ohm

14) Which of the following metric prefixes is NOT commonly used in electronics work? 14) _____

A) tera B) micro C) milli D) kilo E) pico

15) Express the number 10,000 in proper scientific notation. 15) _____

A) 10.0×10^3 B) 1.0×10^4 C) 100.0×10^2 D) 1.0×10^3

16) Convert 4.7 mA to amperes. 16) _____

A) 47,000 A B) 0.0047 A C) 4,700 A D) 0.00047 A

17) Convert 120 mW to W. 17) _____

A) 1,200 W B) 0.00012 W C) 120,000 W D) 0.12 W

18) Convert 10,000 ohms to kΩ. 18) _____

A) 100 kΩ B) 1 kΩ C) 1000 kΩ D) 10 kΩ

19) Convert 75 μV to mV. 19) _____

A) 75,000 mV B) 0.000075 mV C) 0.075 mV D) 7500 mV

20) Convert 5.7 mW to μW. 20) _____

A) 0.00057 μW B) 57,000 μW C) 0.057 μW D) 5,700 μW

21) Convert 6.8×10^{-5} W to the closest standard metric prefix. 21) _____

A) 6.8 μW B) 68 μW C) 0.68 μW D) 680 μW

22) Convert 3.95×10^{-4} A to the closest standard metric prefix. 22) _____

A) 0.395 mA B) 395 mA C) 39.5 mA D) 3.95 mA

Convert the following:

23) 2×10^{-3} Amp = _____ 23) _____

A) 0.5 milliamps B) 2 amps C) 2 milliamps D) 2 microamps

24) 4.7 kΩ = _____ 24) _____

A) 4.7×10^{-3} Ω B) 4.7×10^{3} Ω C) 4.7×10^{-4} Ω D) 47×10^{-3} Ω

25) 3.9 kΩ = _____ 25) _____

A) 3.9×10^{-4} Ω B) 3.9×10^{5} Ω C) 39×10^{-3} Ω D) 3.9×10^{3} Ω

26) 980 microvolts = _____ 26) _____

A) 980×10^{-3} V
B) 98×10^{3} V
C) 9.80 millivolts
D) both A and C
E) none of the above

27) 2.2 kV = _____ 27) _____

A) 2.2×10^{-3} V B) 2.2×10^{-4} V C) 2,200 Volts D) 22×10^{3} V

28) Siemens is a unit for: 28) _____

A) conductance B) power C) voltage D) resistance

29) The shorthand method that uses a base number between 1 and 10 is called: 29) _____

A) prefix B) engineering notation
C) scientific notation D) decimal

30) The symbol for power is: 30) _____

A) **Z** B) **P** C) **W** D) **Q**

31) Express 0.004730 = _____, _____. 31) _____

A) 4.73×10^{-6}, 4.73 micro B) 4.73×10^{-3}, 4.73 milli
C) $_{M}473 \times 10^{3}$, .473 milli D) 473×10^{-3}, 4.73 milli

32) Express 5.6×10^{-2} in milli, basic units, and micro. 32) _____

A) 5600 milli, 56, 560 pico
B) 56 milli, 0.056, 56000 micro
C) 5.6 milli, 0.056, 56000 micro
D) 560 milli, 5.600, 5600 micro

33) Multiply $(99.2 \times 10^{-6})(48 \times 10^{1})$ = _____, _____. 33) _____

A) 4.76×10^{-2}, 47.6 milli
B) 4.76×10^{-4}, 47.6 milli
C) 476×10^{-3}, 47.6 micro
D) 4.76×10^{-2}, 47.6 nano

34) Add $(430 \times 10^{6}) + (9.75 \times 10^{8})$ = _____, _____. 34) _____

A) 14×10^{9}, 1.4 Giga
B) 1.4×10^{9}, 1.4 Mega
C) 14×10^{9}, 1.4 Giga
D) 1.4×10^{9}, 1.4 Giga

35) Subtract $(3462 \times 10^{0}) - (2.22 \times 10^{2})$ = _____, _____. 35) _____

A) 3.24×10^{3}, 3.24 milli
B) 3.24×10^{3}, 3.24 kilo
C) 3.24×10^{4}, 3.24 kilo
D) 3.24×10^{2}, 3.24 kilo

36) Divide $\frac{(65 \times 10^{-3})}{(2.3 \times 10^{2})}$ = 36) _____

A) 2.83×10^{-3}, 283 micro
B) 2.83×10^{-2}, 283 micro
C) 2.83×10^{-5}, 283 micro
D) 2.83×10^{-4}, 283 micro

37) Convert 4,600,000 Ω to Mega Ω. 37) _____

A) 4.6 Mega Ω
B) 46 Mega Ω
C) 460 Mega Ω
D) 4600 Mega Ω

38) 2 μF = _____ 38) _____

A) 2000 nF
B) 200 pF
C) 2×10^{-6} F
D) both A and C

39) Express the number 51,000,000,000 in proper scientific notation. 39) _____

A) 5.1×10^{11}
B) 5.1×10^{10}
C) 5.1×10^{9}
D) 51×10^{8}

40) The SI system is : 40) _____

A) used for scientific work
B) used for engineering work
C) an international system
D) based on a system of fundamental units
E) all of the above

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

41) The smallest particle of an element that still retains the characteristics of the element is called an atom. 41) _____

42) Electrons are negatively charged particles, and are contained in the nucleus of the atom. 42) _____

43) In the neutral state all atoms contain the same number of protons and electrons. 43) _____

44) The outermost shell of an atom is called the *valence* shell. 44) _____

45) The copper atom contains 29 free electrons. 45) _____

46) The nucleus contains protons and electrons, each with an opposite charge. 46) _____

47) The process of gaining a valence electron is known as ionization. 47) _____

48) Valence electrons are tightly bound in insulators. 48) _____

49) Current value depends on the amount of charge moving past a point in a unit of time. 49) _____

50) The movement of electrons between two points is called voltage. 50) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

51) The best conductor in the following list is: 51) _____
A) Germanium B) Silver C) Copper D) Silicon

52) The materials with the fewest *free* electrons are classified as: 52) _____
A) conductors B) silly putty
C) insulators D) semiconductors

53) The unit of electrical charge is measured in: 53) _____
A) Coulombs B) positive or negative charges
C) amperes D) free electrons

54) How is a negative ion produced? 54) _____
A) the atom gains a proton in the nucleus
B) the atom gains an electron in the nucleus
C) the atom loses an electron from the valence shell
D) the atom gains an electron in the valence shell

55) A voltage source contains which of the following? 55) _____
A) electromotive force B) potential energy
C) potential difference D) all of the above

56) Which of the following is NOT a voltage source? 56) _____
A) semiconductor B) solar cell C) battery D) generator

57) The rate of flow of free electrons in a conductive material is called: 57) _____
A) voltage B) coulomb C) current D) ampere

58) Five coulombs of charge flow past a point in 0.5 seconds. How many amperes of current are flowing? 58) _____
A) 15 A B) 20 A C) 5 A D) 10 A

59) The opposition to current is called: 59) _____
A) conductance B) insulators C) ohms D) resistance

60) The typical resistor to use for higher power applications would be the: 60) _____
A) carbon–composition
B) wire wound
C) metal film
D) carbon film
E) metal oxide

61) A resistor coded with Red–Violet–Black–Gold bands respectively, would be of what value and tole rance?

61) _____
A) 2.7 Ω +/– 5% B) 0.27 Ω +/– 5% C) 27 Ω +/– 5% D) 270 Ω +/– 5%

62) A potentiometer is a: 62) _____
A) voltage–control device B) 3–terminal device
C) variable resistor D) all of the above

63) Which of the following is NOT needed to form an electric circuit? 63) _____
A) voltage source B) conductive path for current
C) switch D) load

64) To measure current with an ammeter, connect the ammeter: 64) _____
A) across the voltage source B) across the resistance
C) across the load D) in the current path

65) DMM's are the most widely used type of electronic measuring instrument because of: 65) _____
A) greater ease of reading
B) more functions provided
C) better accuracy
D) greater reliability
E) all of the above

66) Determine the tolerance and resistance of a resistor labeled 470KJ. 66) _____
A) 47 kΩ +/– 5% B) 47 Ω +/– 5% C) 4700 Ω +/– 5% D) 470 kΩ +/– 5%

67) A rheostat is a: 67) _____
A) voltage–control device B) 3–terminal device
C) variable resistor D) all of the above

68) What is the maximum resolution of a 3 1/2–digit DMM when measuring volts? 68) _____
A) 0.0001 V B) 0.1 V C) 0.001 V D) 0.01 V

69) The adjustable contact of a 1 k linear potentiometer is set at 3/4 of full rotation from the lower–end terminal. What is the resistance between the adjustable contact and the upper–end terminal? 69) _____
A) 1 kΩ B) 500 Ω C) 250 Ω D) 750 Ω

70) If you need a 5.1 Ω resistor with +/– 5% tolerance, what color code should you look for? 70) _____
A) GRN–BRN–BLK–GOLD B) GRN–BLK–GOLD–GOLD
C) BLU–BRN–BL–GOLD D) GRN–BRN–GOLD–GOLD

71) The negative and positive charge symbols are assigned (in that order) to the: 71) _____
A) atom and nucleus B) electron and proton
C) electron and element D) proton and electron

72) Valence electrons of an atom determine the: 72) _____
A) chemical and electrical stability B) atomic number
C) electrical stability only D) chemical stability only

73) What is the most commonly used conductor in electronics? 73) _____
A) silver B) aluminum C) gold D) copper

74) A conductor has 3.12 x 10^{20} electrons pass through it. How much charge is this? 74) _____
A) 3.12 coulombs B) 20 coulombs C) 62.4 coulombs D) 50 coulombs

75) The capacity of a battery cell is measured by the amount of _____ that can be supplied over time. 75) _____
A) voltage B) coulomb C) joules D) current

76) If a fluid system is compared to an electrical system, the fluid pump will correspond to a: 76) _____
A) generator B) conductor C) battery D) both A and C

77) The force that causes conductor electrons to move is: 77) _____
A) voltage B) conductance C) current D) resistance

78) Current equals: 78) _____
A) coulombs × time B) $\frac{\text{coulombs}}{\text{time}}$
C) voltage × time D) $\frac{\text{voltage}}{\text{time}}$

79) Electrical current is defined as the movement of which subatomic particles? 79) _____
A) molecules B) protons C) neutrons D) electrons

80) Siemens is a unit for: 80) _____
A) current B) resistance C) conductance D) voltage

81) _____ would NOT increase the resistance of the wire. 81) _____
A) A lower AWG size wire B) Winding pattern
C) A smaller diameter wire D) Use in a hotter environment

82) Which statement is NOT true? 82) _____
A) A rheostat is a two terminal device.
B) A rheostat can be used as a potentiometer.
C) A potentiometer can be used as a rheostat.
D) A potentiometer is a three terminal device.

83) The fifth band in a precision resistor represents the: 83) _____
A) reliability B) multiplier C) tolerance D) failure rate

84) A green fifth–band on a precision resistor indicates a tolerance value of: 84) _____
A) ±0.5% B) ±2% C) ±1% D) ±0.25%

85) What is the tolerance of a resistor manufactured to a minimum value of 5445 ohms and a maximum value of 5555 ohms? 85) _____
A) 20% B) 1% C) 2% D) 10%

86) What is the resistance value and tolerance with color bands of gray, red, black, and gold? 86) _____
A) 82 ohms, ± 5% B) 820 ohms, ± 10%
C) 82 ohms, ± 10% D) 820 ohms, ± 5%

87)  87) _____

The switch shown is a:

A) SPDT B) DPDT C) SPST D) DPST

88) Ground is the reference point in electric circuits and has a potential of _____ with respect to other points in the circuit. 88) _____
A) 0 volts B) an electron
C) source voltage D) none of the above

89) In Bohr's model, the _____ level is called the ground state and represents the _____ atom with a single electron in the first shell. 89) _____
A) lowest, least stable B) lowest, most stable
C) highest, most stable D) lowest, least stable

90) Which is NOT one of the three categories of materials used in electronics? 90) _____
A) crystals B) insulators C) semiconductors D) conductors

91) Which of the following is a true statement? 91) _____
A) The property of a material to oppose current flow is called work.
B) The more collisions, the more restrictive the flow of electrons.
C) The more collisions, the easier the flow of electrons.
D) Collisions do not cause electrons to lose some of their energy.

92) Which of the following is a true statement? 92) _____
A) Voltage is charge (Q) divided by energy (W).
B) Work is the product of voltage (V) and charge (Q).
C) Voltage is not determined by work.
D) Voltage is not determined by charge.

93) Voltage can be produced by means of: 93) _____
A) light energy
B) chemical energy
C) magnetic energy combined with mechanical motion
D) all of the above

94) Which of the following is NOT a true statement? 94) _____
A) Batteries are usually classified according to their chemical makeup.
B) Flat, round batteries are often called button or coin batteries.
C) A lead–acid battery is a secondary (rechargeable) battery.
D) Lithium–Ion is a primary battery.

95) Transistors used as switches 95) _____
A) Can open and close a circuit path.
B) Can be controlled by voltage.
C) Are often called semiconductor switches.
D) all of the above
E) none of the above

96) Resistance of the human body averages between: 96) _____
A) 90K ohms and 100K ohms B) 10K ohms and 50K ohms
C) 50K ohms and 100K ohms D) zero ohms and 100K ohms

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

97) The voltage across a circuit resistance is inversely related to the current through that resistance. 97) _____

98) Increasing voltage while maintaining the same resistance will cause current to decrease. 98) _____

99) A change in voltage will result in a linearly proportional change in current. 99) _____

100) A mathematical relationship between current, voltage, and resistance was determined by George Ohm? 100) _____

101) A short could best be described as a unintended path for voltage. 101) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

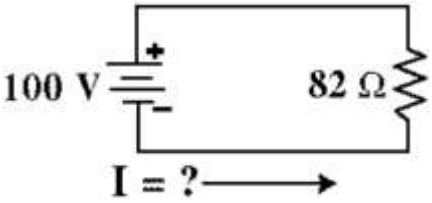

Figure 3–1

102) Given the circuit in Figure 3–1, how many amps of current flow through the circuit? 102) _____

A) 8.2 A B) 1.0 A C) 1.22 A D) 0.82 A

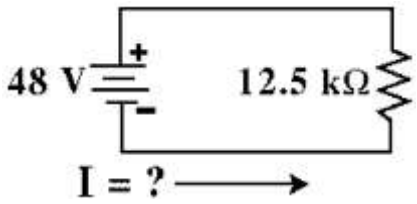

Figure 3–2

103) Given the circuit in Figure 3–2, how much current is flowing through the circuit? 103) _____

A) 3.84 μA B) 3.84 A C) 0.26 mA D) 3.84 mA

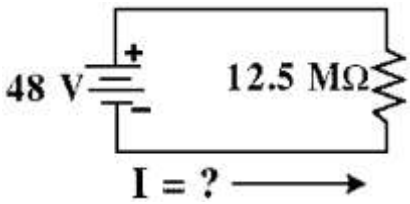

Figure 3–3

104) Given the circuit in Figure 3–3, how much current flows through the circuit? 104) _____

A) 3.84 μA B) 3.84 A C) 3.84 mA D) 0.26 mA

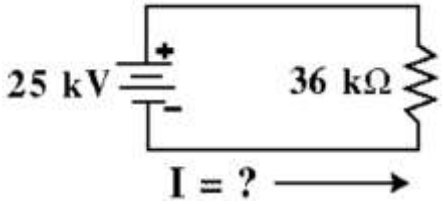

Figure 3–4

105) Given the circuit in Figure 3–4, how much current flows through the circuit? 105) _____

A) 0.67 mA B) 1.5 A C) 0.69 A D) 1.5 mA

106) To obtain voltage in volts, you must express the value of **I** in _____ and the value of **R** in _____. 106) _____

A) Amperes, Ohms B) Milliamperes, Megohms
C) Amperes, Kilo–Ohms D) Milliamperes, Ohms

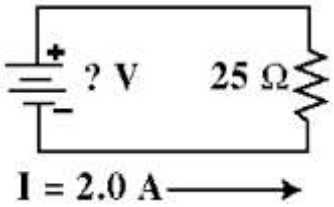

Figure 3–5

107) Given the circuit in Figure 3–5, What voltage is required to produce a current of 2.0 Amps? 107) _____

A) 50 V B) 12.5 V C) 1.25 V D) 5.0 V

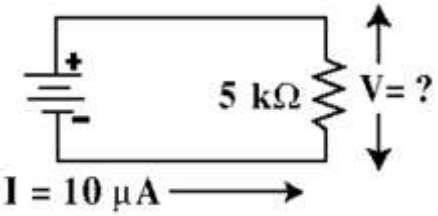

Figure 3–6

108) Given the circuit in Figure 3–6, What is the voltage across the resistor? 108) _____

A) 2.0 mV B) 2.0 V C) 50 V D) 50 mV

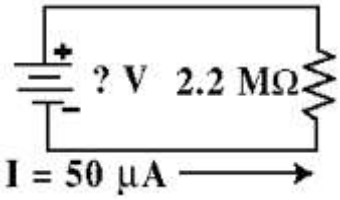

Figure 3–7

109) Given the circuit in Figure 3–7, what is the battery voltage? 109) _____

A) 110 V B) 110 μV C) 22.7 V D) 110 mV

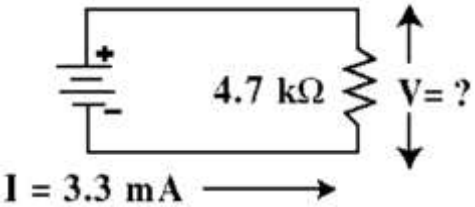

Figure 3–8

110) Given the circuit in Figure 3–8, what is the voltage across the resistor? 110) _____

A) 1.42 V B) 51.2 V C) 15.5 mV D) 15.5 V

111) To obtain the resistance in Ohms, you must express the value of **I** in _____ and the value of **V** in _____. 111) _____

A) Amperes, Volts B) Amperes, Millivolts

C) Milliamperes, Volts D) Microamperes, Millivolts

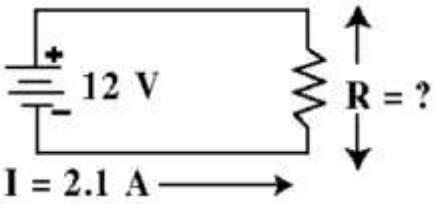

Figure 3–9

112) Given the circuit in Figure 3–9, what resistance is required to draw the specified current? 112) _____

A) 25.2 Ω B) 5.7 Ω C) 5.7 kΩ D) 11.4 Ω

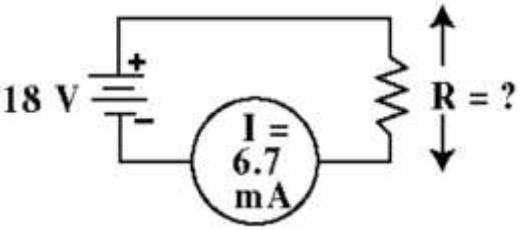

Figure 3–10

113) Given the circuit in Figure 3–10, what is the value of the resistor? 113) _____

A) 4.78 kΩ B) 2.69 Ω C) 2.69 kΩ D) 121 Ω

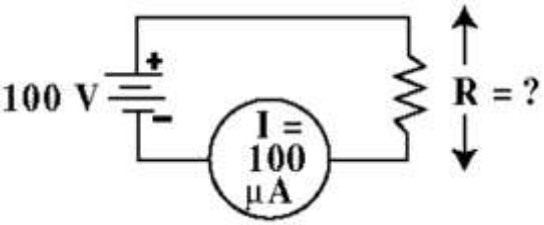

Figure 3–11

114) Given the circuit in Figure 3–11, what is the value of the resistor? 114) _____

A) 100 kΩ B) 1 kΩ C) 1 Ω D) 1 MΩ

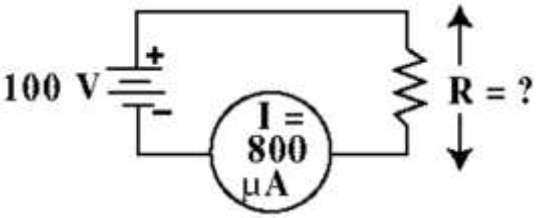

Figure 3–12

115) Given the circuit in Figure 3–12, what is the value of the resistor? 115) _____

A) 800 kΩ B) 125 kΩ C) 8 MΩ D) 125 Ω

116) If the voltage across a resistor has tripled, the current will: 116) _____

A) triple B) stay the same C) double D) decrease

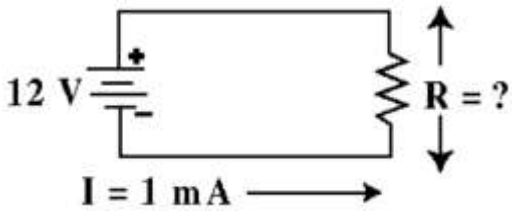

Figure 3–13

117) Given the circuit in Figure 3–13 what resistance is required to draw the specified current? 117) _____

A) 11.2 kΩ B) 12 kΩ C) 120 kΩ D) 120 Ω

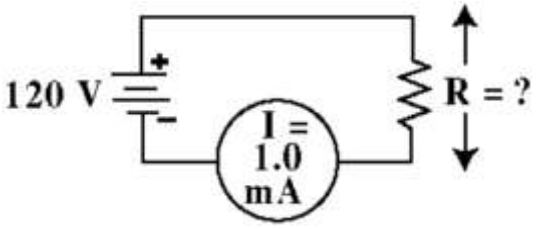

Figure 3–14

118) Given the circuit in Figure 3–14 what is the value of the resistor? 118) _____

A) 12 Ω B) 120 kΩ C) 12 kΩ D) 120 Ω

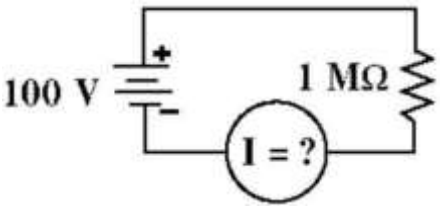

Figure 3–15

119) Given the circuit in Figure 3–15, what is the circuit current? 119) _____

A) 0.00001 A B) 0.01 A C) 0.001 A D) 0.0001 A

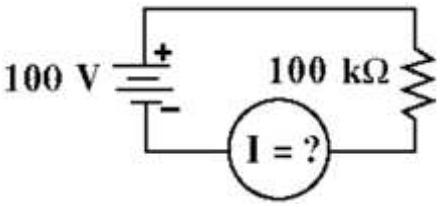

Figure 3–16

120) Given the circuit in Figure 3–16, what is the circuit current? 120) _____

A) 1 mA B) 10 μA C) 1 μA D) 100 μA

121) If the voltage in a circuit has *doubled*, the current will: 121) _____

A) triple B) stay the same C) double D) decrease

122) How is Ohm's law expressed in words? 122) _____

A) The current is *linearly proportional* to the voltage and *inversely proportional* to the resistance.
B) The voltage is *linearly proportional* to the current and *inversely proportional* to the resistance.
C) The current is *linearly proportional* to the resistance and *inversely proportional* to the voltage.
D) The voltage is *linearly proportional* to the resistance and *inversely proportional* to the current.

123) A battery applies 45 volts to a circuit, while an ammeter reads 10 mA. Later, the ammeter reading drops to 7 mA. Assuming the resistance has not changed, the voltage must have: 123) _____

A) increased to 58.5 volts
B) decreased to 31.5 volts
C) decreased 30% from its old value
D) both B and C are correct
E) stayed the same

124) If a variable voltage source is set to 12 volts. To what voltage must it be adjusted to decrease the circuit current by 25%? 124) _____

A) Decrease it to 9 volts.
B) Decrease it to 6 volts.
C) Increase it to 20 volts.
D) Increase it to 16 volts.

125) A certain resistor has a color code of (Red/Red/Red/Gold). If this resistor were connected across the terminals of a 12 volt car battery, what nominal current would flow through the resistor? 125) _____

A) 5.45 mA B) 5.74 mA C) 5.19 mA D) 6.0 mA

126) You found a real bargain on a dashboard fan at a flea market. When you got home, you discovered it was a 6 volt fan that would draw 500 mA at 6 V. Your car has a 12 V system. You need a resistor that will drop 6 V at 500 mA. What value resistor do you need? 126) _____

A) 12 Ω B) 18 Ω C) 6.0 Ω D) 6.2 Ω

127) Which of the following is a form of Ohm's Law? 127) _____

A) I = V × R B) $R = \frac{V}{I}$ C) $V = \frac{R}{I}$ D) $I = \frac{R}{V}$

128) How much current flows when a 15 ohm resistor is connected across a 5 V source? 128) _____

A) 0.33 A B) 3.0 A C) 3.3 A D) 0.5 A

129) What electromotive force would cause 20 A of current to flow through a 500 ohm resistor? 129) _____

A) 1 kV B) 2.5 V C) 10 kV D) 25 V

130) If V = 50 V and R = 100 kΩ the current equals _____. 130) _____

A) 500 μA B) 50 mA C) 0.5 mA D) both A and C

131) The current through a 10 kΩ resistor is 14 μA. What is the voltage drop across the resistor? 131) _____

A) 14 mV B) 140 mV C) 1.4 V D) 14 V

132) How many ohms of resistance allows a current of 720 μA to flow, when 3.6 kV is applied? 132) _____

A) 200 kΩ B) 5 kΩ C) 200 nΩ D) 5 MΩ

133) How many amperes will flow in a circuit that contains a 110 V source and 20 kΩ of resistance? 133) _____

A) 55 mA B) M55 mA C) 5.5 mA D) 5.5 A

134) How much voltage is needed to produce a current of 5 A when total opposition is 50 Ω? 134) _____

A) 2.5 V B) 2.5 kV C) 250 V D) 25 V

135) If an ammeter in a circuit is reading 20 mA and the applied voltage is 25 V, what would the value of the load resistor be? 135) _____

A) 12.5 kΩ B) 125 Ω C) 1.25 kΩ D) 12.5 Ω

136) When circuit voltage increases and resistance decreases at the same rate, current will: 136) _____

A) double
B) increase
C) decrease by half
D) not enough information

137) Voltage and current are: 137) _____
A) inversely proportional
B) directly proportional
C) quantities that subtract
D) ideally the same value

138) If an electric circuit draws 1 A at 50 V, how much current will it draw if the voltage is increased to 75 V? 138) _____
A) 15 μA
B) $_M$15 V
C) 15 mA
D) 1.5 A

139) If the resistor's voltage is 3 V, with 100 mA flowing through it, what is the resistors value? 139) _____
A) 0.3 Ω
B) 0.03 Ω
C) 30 Ω
D) 3.0 Ω

140) What EMF would cause 20 A of current to flow through a 500 Ω resistor? 140) _____
A) 10 kV
B) 2.5 V
C) 0.04 V
D) 1 kV

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

141) Energy is the ability to do work. 141) _____

142) Power is the rate at which energy is used. 142) _____

143) Voltage forces electrical energy through a circuit. 143) _____

144) If 50 Joules are used in ten seconds, the power will be 500 Watts. 144) _____

145) One Watt equals one Joule per second. 145) _____

146) The power dissipated by a resistor doubles if the applied voltage doubles. 146) _____

147) A 1 kW load that operates for 1 hour consumes the same amount of energy as a 100 W load that operates for 10 hours. 147) _____

148) Efficiency is determined by dividing the power output by the power input. 148) _____

149) The rate at which work is performed is called power. 149) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

150) The symbol for power is: 150) _____
A) **I**
B) **W**
C) **J**
D) **P**

151) Power is measured in: 151) _____
A) Joules
B) Amperes
C) Energy
D) Watts

152) How many Watts are used when 6000 Joules of energy are consumed in 5 hours? 152) _____
A) 1200 W
B) 200 W
C) 6000 W
D) 0.33 W

153) Convert 0.072 W to mW. 153) _____
A) 0.000072 mW
B) 7.2 mW
C) 720 mW
D) 72 mW

154) Express 0.15 mW as μW. 154) _____
A) 0.00015 μW
B) 1.5 μW
C) 150 μW
D) 15 μW

155) Power companies charge for energy used on the basis of: 155) _____
A) MWh B) kW C) kWh D) Wh

156) The collision of electrons when passing through resistance results in energy loss given off as: 156) _____
A) light B) watts C) voltage D) heat

157) Which of the following is NOT a correct formula for calculating power? 157) _____
A) $P = VR$ B) $P = IV$ C) $P = V^2/R$ D) $P = I^2R$

158) The amount of current in a circuit is 10 mA, while the resistance is 1 kΩ. Determine the power. 158) _____
A) 0.0001 W B) 100 W C) 0.1 W D) 10 W

159) The amount of voltage in a circuit is 50 V, while the current is 0.2 mA. Determine the power. 159) _____
A) 10 W B) 250 W C) 0.01 W D) 2 W

160) Voltage in a circuit is 100 V, the resistance is 10 kΩ. Determine the power. 160) _____
A) 0.1 W B) 1 W C) 0.01 W D) 10 W

161) The maximum amount of power a resistor can safely handle without damage is called: 161) _____
A) watts B) surface area C) power rating D) heat

162) If one needed a very high power rating, an appropriate choice for the resistor would be: 162) _____
A) carbon–composition B) carbon–film
C) wire wound D) metal–film

163) The change in energy from one end of a resistor to another creates: 163) _____
A) voltage loss B) voltage gain C) voltage drop D) voltage rise

164) A 12 V battery is connected to a 400 Ω load. If it supplied current for 1000 hours, what was its Ah rating? 164) _____
A) 120 Ah B) 30 Ah C) 60 Ah D) 3 Ah

165) A resistor which has a large physical size means: 165) _____
A) it can dissipate more heat B) it can handle less power
C) it contains more resistance in ohms D) it contains more carbon

166) A 5.1 kΩ resistor has burned out in a circuit. You are to replace it with one of like ohmic value. If the resistor should carry 15 mA, which of the following standard resistors should one use? 166) _____
A) 5.1 kΩ, 5 W B) 5.1 kΩ, 2 W C) 5.1 kΩ, 1 W D) 5.1 kΩ, 1/2 W

167) A power supply provides a continuous 200 W to a load, with an efficiency of 80%. In a 24–hour period, how many KWh of energy does it consume? 167) _____
A) 4.8 KWh B) 250 KWh C) 600 KWh D) 6 KWh

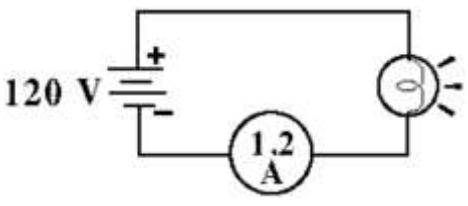

Figure 4–1

168) Given the circuit in Figure 4–1, the power consumed by the lamp is: 168) _____

A) 100 W B) 14 W C) 220 W D) 144 W

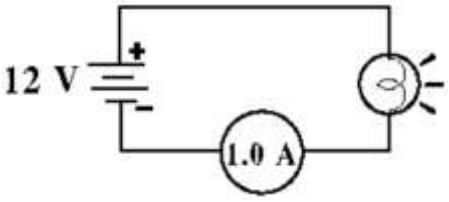

Figure 4–2

169) Given the circuit in Figure 4–2, the power delivered to the lamp is: 169) _____

A) 1.2 W B) 120 W C) 1.0 W D) 12 W

170) Given the circuit in Figure 4–2, what is the resistance of the lamp? 170) _____

A) 120 Ω
B) 1.2 Ω
C) Not enough data to calculate the resistance
D) 12 Ω

Figure 4–3

171) Given the circuit in Figure 4–3, which of the following resistor power values would you use in the circuit? 171) _____

A) 15 W B) 1 W C) 5 W D) 20 W

172) If you installed a 33 Ω, 1 watt resistor in the circuit in Figure 4–3, the resistor will probably: 172) _____

A) short B) produce a little heat
C) burn up D) work fine

173) If a 12 Ω draws 1 A of current, what should be its wattage rating? 173) _____

A) 12 W B) 3/4 W C) 1.2 W D) 1/4 W

174) A system with an input power of 50 W and an output of 20 W has an efficiency of: 174) _____

A) 40% B) 20% C) 25% D) 50%

175) One kilowatt–hour is equivalent to: 175) _____

A) 1.0×10^3 joules B) 3.6×10^6 joules C) 60×10^4 joules D) 3.6×10^5 joules

176) How many joules of energy will a 10 W lamp dissipate in one minute? 176) _____

A) 60 joules B) 600 joules C) 10 joules D) 3600 joules

177) What is the total dissipated power from two series–connected 100 W lamps? 177) _____

A) 50 W B) 10 kW C) 200 W D) 100 W

178) How much power does a 50 V amplifier use when 5 A of current flows through it? 178) _____

A) 250 mW B) 10 W C) 250 W D) 100 mW

179) How long would it take for a 60 W lamp to consume 30.24 kilowatt–hours of power? 179) _____
A) 3 hours B) 0.505 hours C) 3 weeks D) 21 hours

180) 50 mA of current flows through a 10 kΩ resistor. How much power is dissipated? 180) _____
A) 25 W B) 25 mW C) 0.25 μW D) 5 μW

181) The power rating of a resistor is _____ related to _____. 181) _____
A) indirectly, the type of material used
B) directly, the type of cooling used
C) directly, its surface area

182) Which of the following is a correct formula for calculating power? 182) _____
A) $P = IR^2$ B) P = EV C) $P = \frac{V^2}{R}$ D) P = WI

183) How much energy does a 6 V battery have when it stores 12 coulombs of charge? 183) _____
A) 5 joules B) 432 joules C) 2 joules D) 72 joules

184) If a lamp transforms 120 joules of energy into light and heat every 2 seconds, how much power does it use? 184) _____
A) 60 W B) 240 W C) 480 W D) 120 W

185) What value of power is dissipated by a 5 kΩ resistor, when 30 nA flows through it? 185) _____
A) 150 W B) 6.67 mW C) 6 nW D) 4.5 pW

186) What is the kilowatt–hour consumption of a 40 W lamp if it remains "on" for 1750 hours? 186) _____
A) 70,000 B) 70.00 C) 43,750 D) 43.75

187) For a circuit that contains a 50 V power supply and a 100 Ω resistor, what power rating should be assigned to the resistor? 187) _____
A) 250 W B) 125W C) 2.5 W D) 25 W

188) A voltage drop is: 188) _____
A) the loss of energy by electrons as they flow through a resistance
B) the comparison of energy lost from one end of a resistance to the other
C) called a difference of potential
D) all of the above

189) The length of time that a battery can deliver a certain amount of average current to a load at the rated voltage is called the: 189) _____
A) voltage rating B) ampere–hour rating
C) minimum power rating D) current rating

1) FALSE
2) TRUE
3) FALSE
4) FALSE
5) TRUE
6) E
7) A
8) C
9) D
10) A
11) D
12) A
13) D
14) A
15) B
16) B
17) D
18) D
19) C
20) D
21) B
22) A
23) C
24) B
25) D
26) E
27) C
28) A
29) C
30) B
31) B
32) B
33) A
34) D
35) B
36) D
37) A
38) D
39) B
40) E
41) TRUE
42) FALSE
43) TRUE
44) TRUE
45) FALSE
46) FALSE
47) FALSE
48) TRUE
49) TRUE
50) FALSE
51) B

52) C
53) A
54) D
55) D
56) A
57) C
58) D
59) D
60) B
61) C
62) D
63) C
64) D
65) E
66) D
67) C
68) C
69) C
70) D
71) B
72) A
73) D
74) D
75) D
76) D
77) A
78) B
79) D
80) C
81) A
82) B
83) C
84) A
85) B
86) A
87) A
88) A
89) B
90) A
91) B
92) B
93) D
94) D
95) D
96) B
97) FALSE
98) FALSE
99) TRUE
100) TRUE
101) FALSE
102) C
103) D

104) A
105) C
106) A
107) A
108) D
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110) D
111) A
112) B
113) C
114) D
115) B
116) A
117) B
118) B
119) D
120) A
121) C
122) A
123) B
124) A
125) A
126) A
127) B
128) A
129) C
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132) D
133) C
134) C
135) C
136) B
137) B
138) D
139) C
140) A
141) TRUE
142) TRUE
143) FALSE
144) FALSE
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146) FALSE
147) TRUE
148) FALSE
149) TRUE
150) D
151) D
152) D
153) D
154) C
155) C

156) D
157) A
158) C
159) C
160) B
161) C
162) C
163) C
164) B
165) A
166) B
167) D
168) D
169) D
170) D
171) D
172) C
173) A
174) A
175) B
176) B
177) C
178) C
179) C
180) A
181) C
182) C
183) D
184) A
185) D
186) B
187) D
188) D
189) B