Questions from end of chapter 3

END OF CHAPTER PROBLEMS 3–1

Change the following numbers to numbers times 10^3 and to numbers times 10^6:

1. 56,000
2. 15,000
3. 220,000
4. 270,000
5. 39×10^4
6. 730×10^4
7. 1.8×10^5
8. 6.8×10^4
9. 4300×10
10. 3300×10

Change the following numbers to numbers times 10^{-3} and to numbers times 10^{-6}:

11. 0.00022
12. 0.00012
13. 0.00213
14. 0.0000179
15. 0.00556×10^{-2}
16. 0.0133×10^{-1}
17. 1.22×10^{-4}
18. 40×10^{-4}
19. 25.6×10^{-5}
20. 11×10^{-2}

Change the following numbers to numbers times 10^{-9} and to numbers times 10^{-12}:

21. 0.00667×10^{-4}
22. 0.00233×10^{-4}
23. 0.179×10^{-7}
24. 0.00041×10^{-8}
25. 67.4×10^{-10}
26. 273×10^{-10}
27. 1.77×10^{-11}
28. 3.75×10^{-11}
29. 700×10^{-10}
30. 0.034×10^{-7}

Change the following numbers to regular numbers, to numbers times 10^{-3}, and to numbers times 10^3:

31. 73×10^{-1}
32. 4.20×10^2
33. 0.567×10
34. 17.4×10^{-2}
35. 1.78×10^{-2}
36. 92.5×10^{-1}
37. 783×10^{-1}
38. 0.000945×10^2
39. 0.0845×10^4
40. 32.5×10^{-2}

END OF CHAPTER PROBLEMS 3–2

Using the indicated prefixes, change the following quantities:

1. 0.00026 A = _____ mA = _____ μA
2. 0.0736 A = _____ mA = _____ μA
3. 0.000632 S = _____ mS = _____ μS
4. 0.00024 S = _____ mS = _____ μS
5. 7630 Ω = _____ kΩ = _____ MΩ
6. 56,000 Ω = _____ kΩ = _____ MΩ
7. 17.3×10^{-3} A = _____ mA = _____ μA
8. 64×10^{-6} A = _____ mA = _____ μA
9. 71.3×10^4 Ω = _____ kΩ = _____ MΩ
10. 6.8×10^4 Ω = _____ kΩ = _____ MΩ
11. 5.63×10^6 Hz = _____ kHz = _____ MHz
12. 48.7×10^2 Hz = _____ kHz = _____ MHz
13. 2,000,000 Ω = _____ kΩ = _____ MΩ
14. 470,000 Ω = _____ kΩ = _____ MΩ
15. 23.7×10^{-5} S = _____ mS = _____ μS
16. 5.63×10^{-2} S = _____ mS = _____ μS
17. 30×10^{-8} F = _____ μF = _____ nF
18. 1.2×10^{-7} F = _____ μF = _____ nF
19. 0.000062 A = _____ mA = _____ μA
20. 0.0075 A = _____ mA = _____ μA

END OF CHAPTER PROBLEMS 3–3

Using the indicated prefixes, change the following quantities.

1. 800 mA = _____ A
2. 7.03 mA = _____ A
3. 2.5 mS = _____ S
4. 400 μS = _____ S

5. 33 kΩ = _____ Ω
7. 0.47 kΩ = _____ Ω
9. 12.5 kHz = _____ Hz
11. 100 μF = _____ F
13. 0.25 mA = _____ A
15. 900 μS = _____ S
17. 750 kΩ = _____ Ω
19. 30 mA = _____ A

6. 680 kΩ = _____ Ω
8. 0.56 MΩ = _____ Ω
10. 73 kHz = _____ Hz
12. 500 μF = _____ F
14. 50 mA = _____ A
16. 2.5 mS = _____ S
18. 12 kΩ = _____ Ω
20. 30.5 mA = _____ A

END OF CHAPTER PROBLEMS 3–4

Using the indicated prefixes, change the following quantities.

1. 0.00065 A = _____ mA = _____ μA
2. 0.0175 A = _____ mA = _____ μA
3. 0.00000805 S = _____ mS = _____ μS
4. 0.00417 A = _____ mA = _____ μA
5. 56.2×10^{-3} S = _____ mS = _____ μS
6. 245×10^{-3} A = _____ mA = _____ μA
7. 613×10^{-6} S = _____ mS = _____ μS
8. 2.27×10^{-6} A = _____ mA = _____ μA
9. 7500 Ω = _____ kΩ = _____ MΩ
10. 1250 Hz = _____ kHz = _____ MHz
11. 510,000 Ω = _____ kΩ = _____ MΩ
12. 1,800,000 Ω = _____ kΩ = _____ MΩ
13. 12.7×10^{4} Hz = _____ kHz = _____ MHz
14. 77.5×10^{6} Hz = _____ kHz = _____ MHz
15. 713×10^{3} Ω = _____ kΩ = _____ MΩ
16. 910×10^{5} Ω = _____ kΩ = _____ MΩ
17. 46.3 mA = _____ μA = _____ A
18. 415 mS = _____ S = _____ μS
19. 0.05 nF = _____ μF = _____ pF
20. 157 nF = _____ pF = _____ μF
21. 3.2 kΩ = _____ Ω = _____ MΩ
22. 35.9 kHz = _____ Hz = _____ MHz
23. 270 kΩ = _____ MΩ = _____ Ω
24. 4.7 kΩ = _____ MΩ = _____ Ω
25. 403 μS = _____ S = _____ mS
26. 704 mS = _____ S = _____ μS
27. 1.03 MHz = _____ Hz = _____ kHz
28. 42.3 kHz = _____ MHz = _____ Hz
29. 1.43 nF = _____ pF = _____ μF
30. 0.025 μF = _____ pF = _____ nF
31. 55×10^{-4} S = _____ mS = _____ μS
32. 4.67×10^{-4} S = _____ mS = _____ μS
33. 106×10^{-2} nF = _____ μF = _____ pF
34. 7.36×10^{3} nF = _____ μF = _____ pF
35. 4.63×10^{2} kΩ = _____ Ω = _____ MΩ
36. 66.7×10^{2} kΩ = _____ Ω = _____ MΩ
37. 9.63×10^{4} Hz = _____ kHz = _____ MHz
38. 82.3×10^{2} Hz = _____ kHz = _____ MHz
39. 0.0078 A = _____ mA = _____ μA
40. 0.00104 A = _____ mA = _____ μA
41. 176 mV = _____ V = _____ μV
42. 0.000425 V = _____ mV = _____ μV
43. 1.73 W = _____ mW = _____ kW
44. 1.67 W = _____ mW = _____ kW

45. 0.025 H = _____ mH = _____ μH
46. 0.0005 H = _____ mH = _____ μH
47. 173 mS = _____ S = _____ μS
48. 146 μS = _____ mS = _____ S
49. 25×10^{-7} F = _____ μF = _____ nF
50. 250 mH = _____ H = _____ μH

END OF CHAPTER PROBLEMS 3–5

Perform the indicated operations. Round answers to three places.

1. 367 μA + 1.67 mA = _____ mA = _____ μA
2. 0.417 mA + 630 μA = _____ mA = _____ μA
3. 0.0173 mA + 78.4 μA = _____ mA = _____ μA
4. 650 μA + 0.235 mA = _____ mA = _____ μA
5. $\frac{1}{10\ \text{k}\Omega} + \frac{1}{15\ \text{k}\Omega} =$ _____ mS = _____ μS
6. $\frac{1}{6.8\ \text{k}\Omega} + \frac{1}{4.7\ \text{k}\Omega} =$ _____ mS = _____ μS
7. $\frac{1}{33\ \text{k}\Omega} + \frac{1}{56\ \text{k}\Omega} + \frac{1}{100\ \text{k}\Omega} =$ _____ mS = _____ μS
8. $\frac{1}{33\ \text{k}\Omega} + \frac{1}{100\ \text{k}\Omega} + \frac{1}{68\ \text{k}\Omega} =$ _____ mS = _____ μS
9. $\frac{1}{1.2\ \text{k}\Omega} + \frac{1}{4.7\ \text{k}\Omega} + \frac{1}{2.7\ \text{k}\Omega} =$ _____ mS = _____ μS
10. $\frac{1}{270\ \Omega} + \frac{1}{470\ \Omega} + \frac{1}{680\ \Omega} =$ _____ mS = _____ μS
11. $\frac{1}{\frac{1}{2.7\ \text{k}\Omega} + \frac{1}{1.5\ \text{k}\Omega}} =$ _____ Ω = _____ kΩ
12. $\frac{1}{\frac{1}{8.2\ \text{k}\Omega} + \frac{1}{6.8\ \text{k}\Omega}} =$ _____ Ω = _____ kΩ
13. $\frac{1}{\frac{1}{100\ \text{k}\Omega} + \frac{1}{220\ \text{k}\Omega}} =$ _____ Ω = _____ kΩ = _____
14. $\frac{1}{\frac{1}{470\ \text{k}\Omega} + \frac{1}{680\ \text{k}\Omega}} =$ _____ Ω = _____ kΩ = _____
15. $\frac{1}{\frac{1}{39\ \text{k}\Omega} + \frac{1}{12\ \text{k}\Omega} + \frac{1}{27\ \text{k}\Omega}} =$ _____ Ω = _____ kΩ = _____
16. $\frac{1}{\frac{1}{1.2\ \text{M}\Omega} + \frac{1}{2.7\ \text{M}\Omega} + \frac{1}{1\ \text{M}\Omega}} =$ _____ Ω = _____ kΩ = _____
17. $\frac{1}{\frac{1}{180\ \Omega} + \frac{1}{470\ \Omega} + \frac{1}{1\ \text{k}\Omega}} =$ _____ Ω = _____ kΩ
18. $\frac{1}{\frac{1}{330\ \Omega} + \frac{1}{820\ \Omega} + \frac{1}{910\ \Omega}} =$ _____ Ω = _____ kΩ
19. $\frac{1}{213\ \mu\text{S}} =$ _____ Ω = _____ kΩ
20. $\frac{1}{2.75\ \text{mS}} =$ _____ Ω = _____ kΩ

21. $500\ \mu S + 1.76\ mS + 0.000043\ S =$ _____ mS = _____ μS
22. $670\ \mu S + 2\ mS + 0.00002\ S =$ _____ mS = _____ μS
23. $\frac{9\ V}{33\ k\Omega} =$ _____ mA = _____ μA
24. $\frac{12\ V}{2.7\ k\Omega} =$ _____ mA = _____ μA
25. $\frac{14\ V}{200\ \mu A} =$ _____ Ω = _____ $k\Omega$
26. $\frac{10\ V}{2.5\ mA} =$ _____ Ω = _____ $k\Omega$
27. $\frac{50\ V}{1.2\ M\Omega} =$ _____ mA = _____ μA
28. $\frac{40\ V}{15\ \mu A} =$ _____ $k\Omega$ = _____ $M\Omega$
29. $68\ k\Omega \times 140\ \mu A =$ _____ V = _____ mV
30. $270\ k\Omega \times 0.17\ mA =$ _____ V = _____ mV
31. $1.2\ k\Omega \times 3.73\ mA =$ _____ V = _____ mV
32. $4.7\ k\Omega \times 634\ \mu A =$ _____ V = _____ mV
33. $\frac{1}{6.28 \times 75\ kHz \times 25\ pF} =$ _____ Ω = _____ $k\Omega$
34. $\frac{1}{6.28 \times 2.5\ kHz \times 20\ nF} =$ _____ Ω = _____ $k\Omega$
35. $\frac{1}{6.28 \times 10\ kHz \times 0.05\ \mu F} =$ _____ Ω = _____ $k\Omega$
36. $\frac{1}{6.28 \times 37.2\ kHz \times 200\ nF} =$ _____ Ω = _____ $k\Omega$
37. $\frac{1}{6.28 \times 12\ kHz \times 2.7\ k\Omega} =$ _____ μF = _____ nF
38. $\frac{1}{6.28 \times 200\ Hz \times 600\ \Omega} =$ _____ μF = _____ nF
39. $\frac{1}{6.28(150\ mH \times 200\ nF)^{1/2}} =$ _____ Hz = _____ kHz
40. $\frac{1}{6.28(0.75\ mH \times 0.5\ nF)^{1/2}} =$ _____ Hz = _____ kHz

When two resistors are connected in parallel, their total resistance can be calculated. Using equation (3–2) or (3–3):

41. If $R_1 = 10\ k\Omega$ and $R_2 = 10\ k\Omega$, then R_T equals _____ Ω = _____ $k\Omega$?
42. If $R_1 = 10\ k\Omega$ and $R_2 = 9\ k\Omega$, then R_T equals _____ Ω = _____ $k\Omega$?
43. If $R_1 = 10\ M\Omega$ and $R_2 = 10\ k\Omega$, then R_T equals _____ Ω = _____ $k\Omega$?
44. If $R_1 = 1\ M\Omega$ and $R_2 = 5\ M\Omega$, then R_T equals _____ $k\Omega$ = _____ $M\Omega$?

When three resistors are connected in parallel, their total resistance can be calculated. Using equation (3–4) or (3–5):

45. If $R_1 = 10\ k\Omega$, $R_2 = 10\ k\Omega$, and $R_3 = 5\ k\Omega$, then R_T equals _____ Ω = _____ $k\Omega$?
46. If $R_1 = 500\ \Omega$, $R_2 = 1\ k\Omega$, and $R_3 = 2\ k\Omega$, then R_T equals _____ Ω = _____ $k\Omega$?
47. If $R_1 = 1\ k\Omega$, $R_2 = 2\ k\Omega$, and $R_3 = 4\ k\Omega$, then R_T equals _____ Ω = _____ $k\Omega$?
48. If $R_1 = 1\ M\Omega$, $R_2 = 5\ M\Omega$, and $R_3 = 25\ M\Omega$, then R_T equals _____ Ω = _____ $k\Omega$?
49. The capacitive reactance, X_C, of a capacitor is measured in ohms and is found using the equation $X_C = \frac{1}{2\pi fC}$ where π is a constant (3.14 rounded to three places), f is the frequency in hertz, and C is the capacitance in farads. If the frequency is 10 kHz and the capacitance is 350 pF, what is the capacitive reactance in ohms, kilohms, and megohms, rounded to three places?
50. The capacitive reactance, X_C, of a capacitor is measured in ohms and is found using the equation $X_C = \frac{1}{2\pi fC}$ where π is a constant (3.14 rounded to t places), f is the frequency in hertz, and C is the capacitance in farads. If the frequency is 255 kHz a the capacitance is 200 pF, what is the capacitive reactance in ohms, kilohms, and megohms, rounded three places?

51. The total resistance of three resistors connected in parallel can be found using the equation $R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$. Given that $R_1 = 33\ \text{k}\Omega$, $R_2 = 5.6 \times 10^4\ \Omega$, and $R_3 = 820 \times 10^2\ \Omega$, what is the total resistance in ohms and kilohms, rounded to three places?

52. The total resistance of three resistors connected in parallel can be found using the equation $R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$. Given that $R_1 = 2.7\ \text{M}\Omega$, $R_2 = 15 \times 10^5\ \Omega$, and $R_3 = 910 \times 10^3\ \Omega$, what is the total resistance in ohms and kilohms, rounded to three places?

END OF CHAPTER PROBLEMS 3–6

Make the following conversions. Round answers to four places.

1. 100 centimeters to inches
2. 9 centimeters to inches
3. 40 centimeters to inches
4. 130 centimeters to inches
5. 2.3 meters to inches and yards
6. 2.25 meters to inches and yards
7. 10 meters to yards
8. 27 meters to yards
9. 10,000 meters to yards and miles
10. 15,000 meters to yards and miles
11. 10 inches to centimeters
12. 15 inches to centimeters
13. 35.6 inches to centimeters
14. 50.3 inches to centimeters
15. 880 yards to meters and km
16. 1000 yards to meters and kilometers
17. 55 mi/h to km/h
18. 65 mi/h to km/h
19. 100 mi/h to km/h
20. 75 mi/h to km/h
21. 500 meters/s to feet/s
22. 200 meters/s to feet/s
23. 100 meters/s to feet/s
24. 400 meters/s to feet/s
25. 60 grams to ounces
26. 85 grams to ounces
27. 150 grams to ounces
28. 225 grams to ounces
29. 800 grams to ounces and pounds
30. 1400 grams to ounces and pounds
31. 5 kg to oz and lb
32. 7.5 kg to oz and lb
33. 1.35 lb to kg
34. 0.85 lb to kg
35. 4 oz to g
36. 55 oz to g
37. 0.275 oz to g
38. 0.45 oz to g
39. Two packages to be sent air express weigh 3 lb 7 oz each. What is the shipping weight of the two packages in ounces? In pounds? In grams, rounded to four places?
40. Two packages to be sent air express weigh 2 lb 14 oz each. What is the shipping weight of the two packages in ounces? In pounds? In grams, rounded to four places?
41. How many feet of wire are needed to fence a property line $2\frac{3}{8}$ mi long? How many yards is this? How many kilometers? Round answers to four places.
42. How many feet of wire are needed to fence a property line $3\frac{3}{4}$ mi long? How many yards is this? How many kilometers? Round answers to four places.
43. How many 30-gram packages of seed can be made from 2 kg of seed?
44. How many 40-gram packages of seed can be made from 3 kg of seed?
45. How many liters of weed killer are contained in two 55-gallon drums? How many quarts? (1 gal = 3.785 L)
46. How many liters of weed killer are contained in half a 55-gallon drum? How many quarts?
47. A 75-foot section of highway is to be resurfaced. How many yards is this? How many meters?
48. A 110-foot section of highway is to be resurfaced. How many yards is this? How many meters?
49. If gasoline costs \$2.45/gal, what is the cost per liter?
50. If gasoline costs \$1.85/gal, what is the cost per liter?
51. If an automobile is traveling 70 mi/hr, how fast is it traveling in km/hr?
52. If an automobile is traveling 65 mi/hr, how fast is it traveling in km/hr?
53. Fifteen boxes, each weighing 35 kg, are to be moved. How much weight must be moved? How much is the total weight in pounds?
54. Twenty-five boxes, each weighing 56 kg, are to be moved. How much weight must be moved? How much is the total weight in pounds?
55. A recipe calls for 5 mL of vanilla flavoring and 28 cL of milk. How much liquid is this in mL? In pints?
56. A recipe calls for 7 mL of vanilla flavoring and 36 cL of milk. How much liquid is this in mL? In pints?

Solutions for end of chapter 3 questions

CHAPTER 3

PRACTICE PROBLEMS 3–1

1. $27{,}000 = 27 \times 10^3 = 0.027 \times 10^6$
2. $330{,}000 = 330 \times 10^3 = 0.330 \times 10^6$
3. $5600 = 5.60 \times 10^3 = 0.0056 \times 10^6$
4. $390 \times 10^2 = 39 \times 10^3 = 0.039 \times 10^6$
5. $68 \times 10^4 = 680 \times 10^3 = 0.680 \times 10^6$
6. $1{,}200{,}000 = 1200 \times 10^3 = 1.20 \times 10^6$
7. $180 \times 10^4 = 1800 \times 10^3 = 1.8 \times 10^6$
8. $1500 \times 10^5 = 150{,}000 \times 10^3 = 150 \times 10^6$
9. $1800 \times 10^2 = 180 \times 10^3 = 0.180 \times 10^6$
10. $51 \times 10^5 = 5100 \times 10^3 = 5.1 \times 10^6$
11. $0.000423 = 0.423 \times 10^{-3} = 423 \times 10^{-6}$
12. $0.00716 = 7.16 \times 10^{-3} = 7160 \times 10^{-6}$

END OF CHAPTER PROBLEMS 3–1

1. $56 \times 10^3 = 0.056 \times 10^6$
3. $220 \times 10^3 = 0.220 \times 10^6$
5. $390 \times 10^3 = 0.39 \times 10$
7. $180 \times 10^3 = 0.18 \times 10^6$
9. $43 \times 10^3 = 0.043 \times 10^6$
11. $0.22 \times 10^{-3} = 220 \times$

13. $2.13 \times 10^{-3} = 2130 \times 10^{-6}$
17. $0.122 \times 10^{-3} = 122 \times 10^{-6}$
21. $667 \times 10^{-9} = 667{,}000 \times 10^{-12}$
25. $6.74 \times 10^{-9} = 6740 \times 10^{-12}$
29. $70 \times 10^{-9} = 70{,}000 \times 10^{-12}$
33. $5.67 = 5670 \times 10^{-3} = 0.00567 \times 10^{3}$
37. $78.3 = 78{,}300 \times 10^{-3} = 0.0783 \times 10^{3}$
15. $0.0556 \times 10^{-3} = 55.6 \times 10^{-6}$
19. $0.256 \times 10^{-3} = 256 \times 10^{-6}$
23. $17.9 \times 10^{-9} = 17{,}900 \times 10^{-12}$
27. $0.0177 \times 10^{-9} = 17.7 \times 10^{-12}$
31. $7.3 = 7300 \times 10^{-3} = 0.0073 \times 10^{3}$
35. $0.0178 = 17.8 \times 10^{-3} = 0.0000178 \times 10^{3}$
39. $845 = 845{,}000 \times 10^{-3} = 0.845 \times 10^{3}$

PRACTICE PROBLEMS 3–2

1. $2700\ \Omega = 2.7\ \text{k}\Omega = 0.0027\ \text{M}\Omega$
3. $0.00076\ \text{A} = 0.76\ \text{mA} = 760\ \mu\text{A}$
5. $0.0000002\ \text{F} = 0.2\ \mu\text{F} = 200\ \text{nF}$
7. $68{,}000\ \Omega = 68\ \text{k}\Omega = 0.068\ \text{M}\Omega$
9. $3{,}500{,}000\ \text{Hz} = 3500\ \text{kHz} = 3.5\ \text{MHz}$
11. $5 \times 10^{-4}\ \text{S} = 0.5\ \text{mS} = 500\ \mu\text{S}$
13. $21 \times 10^{-2}\ \text{A} = 210\ \text{mA} = 210{,}000\ \mu\text{A}$
15. $45 \times 10^{-4}\ \text{H} = 4.5\ \text{mH} = 4500\ \mu\text{H}$
2. $12{,}000\ \text{Hz} = 12\ \text{kHz} = 0.012\ \text{MHz}$
4. $0.000023\ \text{A} = 0.023\ \text{mA} = 23\ \mu\text{A}$
6. $0.000004\ \text{F} = 4\ \mu\text{F} = 4000\ \text{nF}$
8. $120{,}000\ \Omega = 120\ \text{k}\Omega = 0.12\ \text{M}\Omega$
10. $0.00037\ \text{S} = 0.37\ \text{mS} = 370\ \mu\text{S}$
12. $5.6 \times 10^{4}\ \Omega = 56\ \text{k}\Omega = 0.056\ \text{M}\Omega$
14. $68 \times 10^{-10}\ \text{F} = 6.8\ \text{nF} = 6800\ \text{pF}$
16. $0.15 \times 10^{-2}\ \text{V} = 1.5\ \text{mV} = 1500\ \mu\text{V}$

END OF CHAPTER PROBLEMS 3–2

1. $0.26\ \text{mA} = 260\ \mu\text{A}$
3. $0.632\ \text{mS} = 632\ \mu\text{S}$
5. $7.63\ \text{k}\Omega = 0.00763\ \text{M}\Omega$
7. $17.3\ \text{mA} = 17{,}300\ \mu\text{A}$
9. $713\ \text{k}\Omega = 0.713\ \text{M}\Omega$
11. $5630\ \text{kHz} = 5.63\ \text{MHz}$
13. $2000\ \text{k}\Omega = 2\ \text{M}\Omega$
15. $0.237\ \text{mS} = 237\ \mu\text{S}$
17. $0.30\ \mu\text{F} = 300\ \text{nF}$
19. $0.062\ \text{mA} = 62\ \mu\text{A}$

PRACTICE PROBLEMS 3–3

1. $46.7\ \text{mA} = 0.0467\ \text{A}$
2. $407\ \text{mA} = 0.407\ \text{A}$
3. $68\ \text{k}\Omega = 68{,}000\ \Omega$
4. $4.7\ \text{k}\Omega = 4700\ \Omega$
5. $2.73\ \text{kHz} = 2730\ \text{Hz}$
6. $300\ \text{kHz} = 300{,}000\ \text{Hz}$
7. $670\ \mu\text{S} = 0.000670\ \text{S}$
8. $37\ \text{mS} = 0.037\ \text{S}$
9. $55\ \text{mH} = 0.055\ \text{H}$
10. $465\ \mu\text{H} = 0.000465\ \text{H}$
11. $120\ \text{k}\Omega = 120{,}000\ \Omega$
12. $2\ \text{M}\Omega = 2{,}000{,}000\ \Omega$
13. $150\ \text{mA} = 0.150\ \text{A}$
14. $0.43\ \text{mA} = 0.00043\ \text{A}$
15. $0.68\ \text{k}\Omega = 680\ \Omega$

END OF CHAPTER PROBLEMS 3–3

1. 0.800 A
3. 0.0025 S
5. 33,000 Ω
7. 470 Ω
9. 12,500 Hz
11. 0.000100 F
13. 0.00025 A
15. 0.000900 S
17. 750,000 Ω
19. 0.30 A

PRACTICE PROBLEMS 3–4

1. $20\ \text{mA} = 20{,}000\ \mu\text{A} = 0.020\ \text{A}$
2. $0.01\ \mu\text{F} = 10\ \text{nF} = 10{,}000\ \text{pF}$
3. $2\ \text{H} = 2000\ \text{mH} = 2{,}000{,}000\ \mu\text{H}$
4. $2.5\ \text{k}\Omega = 2500\ \Omega = 0.0025\ \text{M}\Omega$
5. $680\ \Omega = 0.680\ \text{k}\Omega = 0.00068\ \text{M}\Omega$
6. $1.8\ \text{V} = 1800\ \text{mV} = 1{,}800{,}000\ \mu\text{V}$
7. $20\ \mu\text{A} = 0.020\ \text{mA} = 0.000020\ \text{A}$
8. $1.5\ \text{M}\Omega = 1500\ \text{k}\Omega = 1{,}500{,}000\ \Omega$
9. $0.02\ \text{S} = 20\ \text{mS} = 20{,}000\ \mu\text{S}$
10. $50\ \text{nF} = 0.050\ \mu\text{F} = 50{,}000\ \text{pF}$
11. $4.7 \times 10^{4}\ \Omega = 47\ \text{k}\Omega = 0.047\ \text{M}\Omega$
12. $16 \times 10^{-7}\ \text{F} = 1.6\ \mu\text{F} = 1600\ \text{nF}$
13. $2.4 \times 10^{-2}\ \text{A} = 24\ \text{mA} = 24{,}000\ \mu\text{A}$
14. $8.4 \times 10^{2}\ \Omega = 0.84\ \text{k}\Omega = 0.00084\ \text{M}\Omega$
15. $56 \times 10^{5}\ \Omega = 5600\ \text{k}\Omega = 5.6\ \text{M}\Omega$
16. $27.3\ \text{mS} = 0.0273\ \text{S} = 27{,}300\ \mu\text{S}$
17. $5600\ \mu\text{S} = 0.00560\ \text{S} = 5.60\ \text{mS}$
18. $170\ \text{mW} = 0.170\ \text{W} = 170{,}000\ \mu\text{W}$
19. $0.000642\ \text{V} = 642\ \mu\text{V} = 0.642\ \text{mV}$
20. $30\ \text{kHz} = 0.030\ \text{MHz} = 30{,}000\ \text{Hz}$

END OF CHAPTER PROBLEMS 3–4

1. $0.65\ \text{mA} = 650\ \mu\text{A}$
3. $0.00805\ \text{mS} = 8.05\ \mu\text{S}$
5. $56.2\ \text{mS} = 56{,}200\ \mu\text{S}$
7. $0.613\ \text{mS} = 613\ \mu\text{S}$
9. $7.50\ \text{k}\Omega = 0.00750\ \text{M}\Omega$
11. $510\ \text{k}\Omega = 0.510\ \text{M}\Omega$
13. $127\ \text{kHz} = 0.127\ \text{MHz}$
15. $713\ \text{k}\Omega = 0.713\ \text{M}\Omega$
17. $46{,}300\ \mu\text{A} = 0.0463\ \text{A}$

19. $0.00005\ \mu F = 50\ pF$
21. $3200\ \Omega = 0.0032\ M\Omega$
23. $0.270\ M\Omega = 270{,}000\ \Omega$
25. $0.000403\ S = 0.403\ mS$
27. $1{,}030{,}000\ Hz = 1030\ kHz$
29. $1430\ pF = 0.00143\ \mu F$
31. $5.5\ mS = 5500\ \mu S$
33. $0.00106\ \mu F = 1060\ pF$
35. $463{,}000\ \Omega = 0.463\ M\Omega$
37. $96.3\ kHz = 0.0963\ MHz$
39. $7.8\ mA = 7800\ \mu A$
41. $0.176\ V = 176{,}000\ \mu V$
43. $1730\ mW = 0.00173\ kW$
45. $25\ mH = 25{,}000\ \mu H$
47. $0.173\ S = 173{,}000\ \mu S$
49. $2.5\ \mu F = 2500\ nF$

SELF-TEST 3–1 THROUGH 3–4

1. $4760 = 4.76 \times 10^3 = 0.00476 \times 10^6$
2. $32.4 \times 10^4 = 324 \times 10^3 = 0.324 \times 10^6$
3. $2.71 \times 10^{-1} = 271 \times 10^{-3} = 0.000271 \times 10^3$
4. $46.7 \times 10^{-2} = 467 \times 10^{-3} = 0.000467 \times 10^3$
5. $76.3\ mA = 0.0763\ A = 76{,}300\ \mu A$
6. $0.0055\ \mu F = 5.5\ nF = 5500\ pF$
7. $8340\ \mu S = 8.34\ mS = 0.00834\ S$
8. $20\ k\Omega = 20{,}000\ \Omega = 0.020\ M\Omega$
9. $75{,}000\ Hz = 0.075\ MHz = 75\ kHz$
10. $146\ mS = 0.146\ S = 146{,}000\ \mu S$

PRACTICE PROBLEMS 3–5

1. $27\ mA + 0.037\ A = 0.064\ A = 64\ mA$
2. $370\ \mu S + 0.060\ mS = 0.430\ mS = 430\ \mu S$
3. $\dfrac{1}{68\ k\Omega} + \dfrac{1}{47\ k\Omega} = 0.036\ mS = 36\ \mu S$
4. $\dfrac{1}{\frac{1}{4.7\ k\Omega} + \frac{1}{1.8\ k\Omega}} = 1300\ \Omega = 1.30\ k\Omega$
5. $\dfrac{20\ V}{27\ k\Omega} = 0.000741\ A = 0.741\ mA = 741\ \mu A$
6. $\dfrac{25\ V}{2.36\ mA} = 10{,}600\ \Omega = 10.6\ k\Omega = 0.0106\ M\Omega$
7. $\dfrac{1}{6.28 \times 12\ kHz \times 50\ nF} = 265\ \Omega = 0.265\ k\Omega$
8. $\dfrac{1}{2.7\ k\Omega} + \dfrac{1}{3.3\ k\Omega} + \dfrac{1}{4.7\ k\Omega} = 0.886\ mS = 886\ \mu S = 0.000886\ S$
9. $\dfrac{1}{\frac{1}{22\ k\Omega} + \frac{1}{33\ k\Omega} + \frac{1}{56\ k\Omega}} = 10{,}700\ \Omega = 10.7\ k\Omega = 0.0107\ M\Omega$
10. $\dfrac{1}{6340\ \mu S} = 158\ \Omega = 0.158\ k\Omega$
11. $2.73\ k\Omega \times 0.43\ mA = 1.17\ V = 1170\ mV$
12. $1.27\ V + 48\ mV + 5630\ \mu V = 1.32\ V = 1320\ mV = 1{,}320{,}000\ \mu V$
13. $1000\ k\Omega = 1\ M\Omega$
14. $1330\ k\Omega = 1.33\ M\Omega$
15. $5450\ \Omega = 5.45\ k\Omega$
16. $6.67\ k\Omega = 0.00667\ M\Omega$
17. $X_C = \dfrac{1}{2\pi f C} = \dfrac{1}{2 \times \pi \times 5 \times 10^3 \times 75 \times 10^{-9}} = 4.24 \times 10^2\ \Omega$

    $X_C = 424\ \Omega = 0.424\ k\Omega = 0.000425\ M\Omega$
18. $R_T = \dfrac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} = \dfrac{1}{\frac{1}{22\ k\Omega} + \frac{1}{3.9 \times 10^4\ \Omega} + \frac{1}{180 \times 10^2\ \Omega}} = \dfrac{1}{1.27 \times 10^{-4}\ S} = 7.90 \times 10^3\ \Omega$

    $R_T = 7900\ \Omega = 7.90\ k\Omega$

END OF CHAPTER PROBLEMS 3–5

1. $2.04\ mA = 2040\ \mu A$
3. $0.0957\ mA = 95.7\ \mu A$
5. $0.167\ mS = 167\ \mu S$
7. $0.0582\ mS = 58.2\ \mu S$
9. $1.42\ mS = 1420\ \mu S$
11. $964\ \Omega = 0.964\ k\Omega$
13. $68{,}700\ \Omega = 68.7\ k\Omega = 0.0687\ M\Omega$
15. $6850\ \Omega = 6.85\ k\Omega = 0.00685\ M\Omega$
17. $115\ \Omega = 0.115\ k\Omega$

19. 4690 Ω = 4.69 kΩ
21. 2.30 mS = 2300 μS
23. 0.273 mA = 273 μA
25. 70,000 Ω = 70.0 kΩ
27. 0.0417 mA = 41.7 μA
29. 9.52 V = 9520 mV
31. 4.48 V = 4480 mV
33. 84,900 Ω = 84.9 kΩ
35. 318 Ω = 0.318 kΩ
37. 0.00491 μF = 4.91 nF
39. 919 Hz = 0.919 kHz
41. 5.00×10^3 ohms = 5.00 k
43. 9.99×10^3 ohms = 9.99 kΩ
45. 2.50×10^3 ohms = 2.50 kΩ
47. 571 ohms = 0.571 kΩ
49. 45.5 kΩ

PRACTICE PROBLEMS 3–6

1. 10.63 in
2. 133.9 in = 3.718 yd
3. 5470 yd = 3.107 mi
4. 68.58 cm
5. 402.3 m = 0.4023 km
6. 3.219 km = 3219 m
7. 1312 ft/s
8. 124.3 mi/h
9. 91.44 m/s
10. 104.6 km/h
11. 2.469 oz
12. 35.27 oz = 2.205 lb
13. 112.9 oz = 7.055 lb
14. 0.9072 kg
15. 69.46 g
16. 5 lb 4 oz = (5 lb × 16 oz/lb + 4 oz) × 2 = (80 oz + 4 oz) × 2 = 168 oz
    168 oz ÷ 16 oz/lb = 10 lb 8 oz = 4763 g
17. 5280 ft/mi × 1.25 mi = 6600 ft
    6600 ft ÷ 3 ft/yd = 2200 yds 1.25 mi × 1.609 km/mi = 2.011 km
18. 2 g × 1000 = 2000 g 2000 g ÷ 25 g/pkg = 80 packages
19. 1 gal = 3.785 L 3.785 L/gal × 55 gal = 208.2 L 55 gal × 8 pt/gal = 440 pt
20. 49 ft ÷ 3 ft/yd = 16.33 yd 16.33 yd × 0.9144 m/yd = 14.93 m
21. $2.12/gal ÷ 3.785 L/gal = $0.5600/L
22. 60 mi/hr × 1.609 km/mi = 96.54 km/hr
23. 20 boxes × 42 kg/box = 840.0 kg 840.0 kg × 2.205 lb/kg = 1852 lb
24. 24 cL = 240 mL 240 mL + 5 mL = 245 mL 245 mL ÷ 473.2 mL/pt = 0.5178 pt

END OF CHAPTER PROBLEMS 3–6

1. 39.37 in
3. 15.75 in
5. 2.3 m = 90.58 in = 2.5
7. 10.94 yd
9. 10,940 yd = 6.216 mi
11. 25.40 cm
13. 90.42 cm
15. 804.7 m = 0.8047 km
17. 88.51 km/h
19. 160.9 km/h
21. 1640 ft/s
23. 328.1 ft/s
25. 2.116 oz
27. 5.291 oz
29. 28.22 oz = 1.764 lb
31. 176.4 oz = 11.02 lb
33. 0.6123 kg
35. 113.4 g
37. 7.796 g
39. $110 \text{ oz} = 6.875 \text{ lb} = \frac{3}{118} \times 10^3 \text{ gr}$
41. 1.254×10^4 ft = 4.180×10^3 yds = 3.821 km
43. 66.7
45. 208.21
47. 25 yd = 27.34 m
49. $0.927/l
51. 70 mi/hr = 113 m/hr
53. 525 kg = 1160 lb
55. 285 ml = 0.603 pts