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**Problem Solutions to Problems Marked With a \* in  
Logic Computer Design Fundamentals, Ed. 2**

**CHAPTER 1**

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**1-1.**

Decimal, Binary, Octal and Hexadecimal Numbers from  $(16)_{10}$  to  $(31)_{10}$

Dec	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Bin	1 0000	1 0001	1 0010	1 0011	1 0100	1 0101	1 0110	1 0111	1 1000	1 1001	1 1010	1 1011	1 1100	1 1101	1 1110	1 1111
Oct	20	21	22	23	24	25	26	27	30	31	32	33	34	35	36	37
Hex	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F

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**1-4.**

$$(1101001)_2 = 2^6 + 2^5 + 2^3 + 2^0 = 105$$

$$(10001011.011)_2 = 2^7 + 2^3 + 2^1 + 2^0 + 2^{-2} + 2^{-3} = 139.375$$

$$(10011010)_2 = 2^7 + 2^4 + 2^3 + 2^1 = 154$$

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**1-7.**

Decimal	Binary	Octal	Hexadecimal
369.3125	101110001.0101	561.24	171.5
189.625	10111101.101	275.5	BD.A
214.625	11010110.101	326.5	D6.A
62407.625	1111001111000111.101	171707.5	F3C7.A

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**1-9.**

$$\begin{aligned} \text{a) } 7562/8 &= 945 + 2/8 &\rightarrow 2 \\ 945/8 &= 118 + 1/8 &\rightarrow 1 \\ 118/8 &= 14 + 6/8 &\rightarrow 6 \\ 14/8 &= 1 + 6/8 &\rightarrow 6 \\ 1/8 &= 1/8 &\rightarrow 1 \end{aligned}$$

$$\begin{aligned} 0.45 \times 8 &= 3.6 &\rightarrow 3 \\ 0.60 \times 8 &= 4.8 &\rightarrow 4 \\ 0.80 \times 8 &= 6.4 &\rightarrow 6 \\ 0.20 \times 8 &= 3.2 &\rightarrow 3 \end{aligned}$$

$$(7562.45)_{10} = (16612.3463)_8$$

$$\text{b) } (1938.257)_{10} = (792.41CA)_{16}$$

$$\text{c) } (175.175)_{10} = (10101111.001011)_2$$

**Problem Solutions – Chapter 1**

**1-11.**

$$\begin{aligned}
 \text{a)} \quad (673.6)_8 &= (110\ 111\ 011.110)_2 \\
 &= (1BB.C)_{16} \\
 \text{b)} \quad (E7C.B)_{16} &= (1110\ 0111\ 1100.1011)_2 \\
 &= (7174.54)_8 \\
 \text{c)} \quad (310.2)_4 &= (11\ 01\ 00.10)_2 \\
 &= (64.4)_8
 \end{aligned}$$

**1-15.**

$$\begin{aligned}
 \text{a)} \quad (BEE)_r &= (2699)_{10} \\
 11 \times r^2 + 14 \times r^1 + 14 \times r^0 &= 2699 \\
 11 \times r^2 + 14 \times r - 2685 &= 0 \\
 \text{By the quadratic equation: } r &= 15 \text{ or } r \approx -16.27 \\
 \text{ANSWER: } r &= 15 \\
 \text{b)} \quad (365)_r &= (194)_{10} \\
 3 \times r^2 + 6 \times r^1 + 5 \times r^0 &= 194 \\
 3 \times r^2 + 6 \times r - 189 &= 0 \\
 \text{By the quadratic equation: } r &= -9 \text{ or } 7 \\
 \text{ANSWER: } r &= 7
 \end{aligned}$$

**1-17.**

$$\begin{array}{rcl}
 (694)_{10} & = & (0110\ 1001\ 0100)_{BCD} \\
 (835)_{10} & = & (1000\ 0011\ 0101)_{BCD} \\
 & & \begin{array}{l} \leftarrow 1 \\ \begin{array}{r} 0110 \quad 1001 \quad 0100 \\ \underline{+1000} \quad \underline{+0011} \quad \underline{+0101} \\ 1111 \quad 1100 \quad 1001 \\ \underline{+0110} \quad \underline{+0110} \quad \underline{+0000} \\ 0001\ 0101 \quad 1\ 0010 \quad 1001 \end{array} \end{array}
 \end{array}$$

**1-20.**

$$\begin{aligned}
 \text{a)} \quad (0100\ 1000\ 0110\ 0111)_{BCD} &= (4867)_{10} \\
 &= (1001100000011)_2 \\
 \text{b)} \quad (0011\ 0111\ 1000.0111\ 0101)_{BCD} &= (378.75)_{10} \\
 &= (101111010.11)_2
 \end{aligned}$$

**1-23.**

$$\begin{aligned}
 \text{a)} \quad (101101101)_2 \\
 \text{b)} \quad (0011\ 0110\ 0101)_{BCD} \\
 \text{c)} \quad 0011\ 0011 \quad 0011\ 0110 \quad 0011\ 0101_{ASCII}
 \end{aligned}$$

**1-25.**

BCD Digits with Odd and Even Parity

	0	1	2	3	4	5	6	7	8	9
Odd	1 0000	0 0001	0 0010	1 0011	0 0100	1 0101	1 0110	0 0111	0 1000	1 1001
Even	0 0000	1 0001	1 0010	0 0011	1 0100	0 0101	0 0110	1 0111	1 1000	0 1001