

“ASSIGNMENT NO 1”



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Class Section: A

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Digital Logic Design

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2. (10 pts.) Convert $(1278.875)_{10}$ to its equivalent representation in the following bases:

I. Base 16 _____

II. Base 8 _____

2) Convert $(1278.875)_{10}$ to its equivalents.

I) $(1278.875)_{10} = ()_{16}$

16	1278
16	79 - 14
16	4 - 15
	0 - 14

$0.875 \times 16 = 14$

$(1278.875)_{10} = (4FE.E)_{16}$

II) $(1278.875)_{10} = ()_8$

8	1278
8	159 - 6
8	19 - 7
8	2 - 3
	0 - 2

$(0.875) \times 8 = 7$

$(1278.875)_{10} = (2376.7)_8$

III. Base 2 _____

IV. Base 7 _____

III)

$$(1278.875)_{10} = ()_2$$

2	1278	
2	639	0
2	319	1
2	159	1
2	79	1
2	39	1
2	19	1
2	9	1
2	4	1
2	2	0
2	1	1
	0	1

$$(0.875) \times 2 = 1.75$$

$$0.75 \times 2 = 1.5$$

$$0.5 \times 2 = 1$$

$$(1278.875)_{10} = (10011111110.111)_2$$

$$iv) (1278.875)_{10} = ()_7$$

7	1278	
7	182	4
7	26	0
	3	5

$$0.875 \times 7 = 6.125$$

$$0.125 \times 7 = 0.875$$

$$(1278.875)_{10} = (3504.60)_7$$

V. Base 3

$$v) (1278.875)_{10} = ()_3$$

3	1278	
3	426	0
3	142	0
3	47	1
3	15	2
3	5	0
	1	2

$$0.875 \times 3 = 2.625$$

$$0.62 \times 3 = 1.86$$

$$0.86 \times 3 = 2.58$$

$$0.58 \times 3 = 1.68$$

$$(1258.875)_{10} = (1202100.2121)_3$$

3. (10 pts.) Find the Base 10 equivalents of the following numbers:

I. $(3F1B.25)_{16}$ _____

II. $(456723.75)_8$ _____

III. $(1011110001110101.10011)_2$ _____

Q 3)

I) $(3F1B.25)_{16} = ()_{10}$

$$(3F1B.25)_{16} = (3 \times 16^3) + (15 \times 16^2) + (1 \times 16^1) + (11 \times 16^0) + (2 \times 16^{-1}) + (5 \times 16^{-2})$$

$$(3F1B.25)_{16} = (16155.144)_{10}$$

II) $(456723.75)_8 = ()_{10}$

$$(456723.75)_8 = (4 \times 8^5) + (5 \times 8^4) + (6 \times 8^3) + (7 \times 8^2) + (2 \times 8^1) + (3 \times 8^0) + (7 \times 8^{-1}) + (5 \times 8^{-2})$$

$$(456723.75)_8 = (455091.95)_{10}$$

III) $(1011110001110101.10011)_2 = ()_{10}$

$$(1011110001110101.10011)_2 = (1 \times 2^{15}) + (0 \times 2^{14}) + (1 \times 2^{13}) + (1 \times 2^{12}) + (1 \times 2^{11}) + (1 \times 2^{10}) + (0 \times 2^9) + (0 \times 2^8) + (0 \times 2^7) + (1 \times 2^6) + (1 \times 2^5) + (1 \times 2^4) + (0 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0) + (1 \times 2^{-1}) + (0 \times 2^{-2}) + (0 \times 2^{-3}) + (1 \times 2^{-4}) + (1 \times 2^{-5})$$

$$(1011110001110101.10011)_2 = (48245.5937)_{10}$$

IV. $(31242.2314)_5$ _____

v. $(31242.60)_7$ _____

$$iv) (31242.2314)_5 = ()_{10}$$

$$(31242.2314)_5 = (3 \times 5^4) + (1 \times 5^3) + (2 \times 5^2) + \\ + (4 \times 5^1) + (2 \times 5^0) + (2 \times 5^{-1}) + (3 \times 5^{-2}) + (1 \times 5^{-3}) + (4 \times 5^{-4})$$

$$(31242.2314)_5 = (2072.5344)_{10}$$

$$v) (31242.60)_7 = ()_{10}$$

$$(31242.60)_7 = (3 \times 7^4) + (1 \times 7^3) + (2 \times 7^2) + \\ + (4 \times 7^1) + (2 \times 7^0) + (6 \times 7^{-1}) + (6 \times 7^{-2})$$

$$(31242.60)_7 = (7674.8571)_{10}$$

4. (5 pts.) Convert the following numbers directly to binary without using an intermediary base:

I. $(3E89.AC27)_{16}$ _____

Convert each digit to binary in four bits group:

$$3_{16} = 0011_2$$

$$E_{16} = 1110_2$$

$$8_{16} = 1000_2$$

$$9_{16} = 1001_2$$

$$A_{16} = 1010_2$$

$$C_{16} = 1100_2$$

$$2_{16} = 0010_2$$

$$7_{16} = 0111$$

Hence

$$(3E89.AC27)_{16} = (11111010001001.10101100001)_2$$

II. $(22144.3561)_8$ _____

Convert each digit to binary in three bits group:

$$2_8 = 010_2$$

$$2_8 = 010_2$$

$$1_8 = 001_2$$

$$4_8 = 100_2$$

$$4_8 = 100_2$$

$$3_8 = 011_2$$

$$5_8 = 101_2$$

$$6_8 = 110_2$$

$$1_8 = 001_2$$

Hence

$$(22144.3561)_8 = 10010001100100.011101110001$$

5. (5 pts.) Convert $(1100110111001010.1011101)_2$ to:

I. Octal _____
 $(001100110111001010.1011101)_2$

Convert each three bits to octal from right to left at point:

$$010_2 = 2_8$$

$$001_2 = 1_8$$

$$111_2 = 7_{16}$$

$$110_2 = 6_8$$

$$100_2 = 4_8$$

$$001_2 = 1_8$$

For fraction:

$$101_2 = 5_8$$

$$110_2 = 6_8$$

$$100_2 = 4_8$$

Hence

$$(001100110111001010.1011101)_2 = (146712.564)_8$$

II. Hexadecimal _____

$$A_{16} = 1010_2$$

$$C_{16} = 1100_2$$

$$D_{16} = 1101_2$$

$$C_{16} = 1100_2$$

For fraction:

$$B_{16} = 1011_2$$

$$A_{16} = 1010_2$$

Hence

$$(001100110111001010.1011101)_2 = (CDCA.BA)_{16}$$

Don't use an intermediary base.

6. (10 pts.) Write the first 20 decimal numbers in base 2 (binary).

Decimal	Binary
1	01
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110
15	1111
16	10000
17	10001
18	10010
19	10011
20	10100