# Assignment - I

## Number System — week - 0

1. a) $(103)_{10} = (?)_2$

| | |
|---|---|
| 2 | 103 |
| 2 | 51 1 |
| 2 | 25 1 |
| 2 | 12 1 |
| 2 | 6 0 |
| 2 | 3 1 |
| | 1 1 |

$(103)_2 = (1110111)_2$

~~$(1110001)_{10} = (103)_{10}$~~

b) $(999)_{10} = (?)_2$

| | |
|---|---|
| 2 | 999 |
| 2 | 499 1 |
| 2 | 249 1 |
| 2 | 124 1 |
| 2 | 62 0 |
| 2 | 31 0 |
| 2 | 15 1 |
| 2 | 7 1 |
| 2 | 3 1 |
| | 1 1 |

$(1111100111)_2 = (999)_{10}$

2 Binary to decimal

a, $(11110101)_2 = (?)_{10}$

| 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
|---|---|---|---|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

$128 + 64 + 32 + 16 + 4 + 1$

$(245)_{10}$

b, $(1000111)_2 = (?)_{10}$

| 1 | 0 | 0 | 0 | 1 | 1 | 1 |
|---|---|---|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

$128 + 8 + 4 + 2 + 1$

$(143)_{10}$

~~4~~ a) $(1101)_2 = (?)_8$

3 $(9910)_{10} = (?)_8$

| 8 | 9910 | |
|---|---|---|
| 8 | 1238 | 6 |
| 8 | 154 | 6 |
| 8 | 19 | 2 |
| | 2 | 3 |

$(23266)_8$

4 a) $(1101)_2 = (?)_8$

1 1 0 1

8 4 2 1

$8 + 4 + 0 + 1$

$(1101)_2 = (13)_{10}$

| 8 | 13 |
|---|---|
| | 1 5 |

$(1101)_2 = (15)_8$

$(15)_8 = (?)_2$

1 5

8 1

8 + 5

$(15)_8 = (13)_{10}$

| 2 | 13 |
|---|---|
| 2 | 6 1 |
| 2 | 3 0 |
| | 1 1 |

$(15)_8 = (1101)_2$

b) $(76)_8 = (?)_{10}$

7 6

8 1

56 + 6

$(76)_8 = (62)_{10}$

| 8 | 62 |
|---|---|
| | 76 |

$(62)_{10} = (76)_8$

c) $(1111\ 1111\ 1110)_2 = (?)_{10}$

| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2048 | 1024 | 512 | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

$(4094)_{10}$

| 2 | 4094 |
|---|---|
| 2 | 2047 0 |
| 2 | 1023 1 |
| 2 | 511 1 |
| 2 | 255 1 |
| 2 | 127 1 |
| 2 | 63 1 |
| 2 | 31 1 |
| 2 | 15 1 |
| 2 | 7 1 |
| 2 | 3 1 |
| | 1 1 |

$(4094)_{10} = (1111\ 1111\ 1110)_2$

d) $(0xF00)_{16} = (?)_8$

| 16 | 1500 |
|---|---|
| | 93 12 |
| | 1 |

F 0 0

256 16 1

3840 + 0 + 0

$(3840)_{10}$

=

| 8 | 3840 |
|---|---|
| 8 | 480 0 |
| 8 | 60 0 |
| | 7 4 |

$(0xF00)_{16} = (7400)_8$

=

7 4 0 0

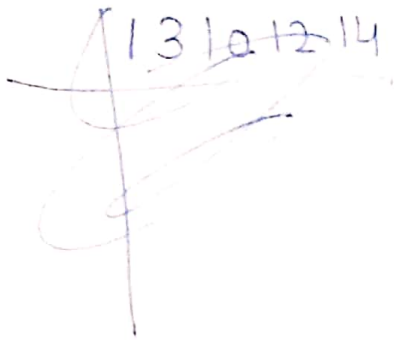
512 64 8 1

3584 + 256 + 0 + 0

$(3840)_{10}$ //

e, $(0xDACE)_{16} = (?)_{12}$

| D | A | C | E |
|---|---|---|---|
| ~~13~~ | 10 | 12 | ~~14~~ |
| ~~4096~~ | ~~256~~ | 16 | 1 |




| D | A | C | E |
|---|---|---|---|
| 13 | 10 | 12 | 14 |
| 4096 | 256 | 16 | 1 |

$53248 + 2560 + 192 + 14$

$(56014)_{10}$

$(56014)_{10} = (?)_{10}$

| | | |
|---|---|---|
| 12 \| | 56014 | |
| 12 \| | 4667 | 10 (A) |
| 12 \| | 388 | 11 (B) |
| 12 \| | 32 | 4 |
| | 2 | 8 |

$(284BA)_{12} = (0xDACE)_{16}$

f) $(0X2B)_{16} = (?)_8$

2 11

0 0 1 0 1 0 1 1

8 4 2 1 8 4 2 1

2

0 0 1 0 1 0 1 1

0 0 0 1 0 1 0 1 1

0 1 1

0 4+1 2+1

$(0X2B)_{16} = (53)_8$

5 3

4 2 1 4 2 1

1 0 1 0 1 1

0 0 1 0 1 0 1 1

0 0 2 0 8 0 2 1

2 11

$(2B)_{16}$ //

5,

a) $(5610)_{10} = (?)_3$

| | |
|---|---|
| 3 | 5610 |
| 3 | 1870 0 |
| 3 | 623 1 |
| 3 | 207 2 |
| 3 | 69 0 |
| 3 | 23 0 |
| 3 | 7 2 |
| | 2 1 |

$(2\,1\,2\,0\,0\,2\,1\,0)_3$

b) $(5610)_{10} = (?)_8$

| | |
|---|---|
| 8 | 5618 |
| 8 | 702 2 |
| 8 | 87 6 |
| 8 | 10 7 |
| | 1 2 |

$(5610)_{10} = (12762)_8$

c) $(5610)_{10} = (?)_{16}$

| | |
|---|---|
| 16 \| | 5610 |
| 16 \| | 350 10(A) |
| 16 \| | 21 14(E) |
| | 1 5 |

$(5610)_{10} = (15EA)_{16}$

d) $(22110)_{10} = (?)_{12}$

| | |
|---|---|
| 12 \| | 22110 |
| 12 \| | 1842 6 |
| 12 \| | 153 6 |
| 12 \| | 12 9 |
| | 1 0 |

$(22110)_{10} = (10966)_{12}$

Q, a) $(34.34)_{10} = (?)_2, (?)_3, (?)_8, (?)_{16}$

3 4 . 3 4

Ans

| | |
|---|---|
| 2 | 34 |
| 2 | 17 0 |
| 2 | 8 1 |
| 2 | 4 0 |
| 2 | 2 0 |
| | 1 0 |

$(34)_{10} = (100010)_2$

$0.34 \times 2 = 0.68 \quad 0$

$0.68 \times 2 = 1.36 \quad 1$

$0.36 \times 2 = 0.72 \quad 0$

$0.72 \times 2 = 1.44 \quad 1$

$(0.34)_{10} = (0.0101)_2$

$(34.34)_{10} = (100010.0101)_2$

$(34.34)_{10} = (?)_3$

| 3 | 34 | |
|---|---|---|
| 3 | 14 | 2 |
| 3 | 4 | 2 |
| | 1 | 1 |

$(34)_{10} = (1122)_3$

$0.34 \times 3 = 1.02$ 1

$0.02 \times 3 = 0.12$ 0

$0.12 \times 3 = 0.36$ 0

$0.36 \times 3 = 1.08$ 1

$(34.34)_{10} = (1122.1001)_3$

$(34.34)_{10} = (?)_8$

| 8 | 34 | |
|---|---|---|
| | 4 | 2 |

$(34)_{10} = (42)_8$

$0.34 \times 8 = 2.72$ 2

$0.72 \times 8 = 5.76$ 5

$0.76 \times 8 = 6.08$ 6

$0.08 \times 8 = 0.64$ 0

$(34.34)_{10} = (42.2560)_8$

$(34)_{10}$

| 16 | 34 |
|---|---|
| | 2 2 |

$(34)_{10} = (22)_{16}$

$0.34 \times 16 = 5.44$ 5

$0.44 \times 16 = 7.04$ 7

$0.04 \times 16 = 0.64$ 0

$0.64 \times 16 = 3.84$ 3

$(34.34)_{10} = (22.5703)_{16}$

b) $(125.125)_{10}$

| 2 | 125 |
|---|---|
| 2 | 62 1 |
| 2 | 31 0 |
| 2 | 15 1 |
| 2 | 7 1 |
| 2 | 3 1 |
| | 1 1 |

$(125)_{10} = (1111101)_2$

$0.125 \times 2 = 0.25$ 0

$0.25 \times 2 = 0.5$ 0

$0.5 \times 2 = 1.0$ 1

$(125.125)_{10} = (1111101.001)_2$

$(125.125)_{10} = (?)_3$

| | |
|---|---|
| 3 | 125 |
| 3 | 41 2 |
| 3 | 13 2 |
| 3 | 6 1 |
| | 2 0 |

$(125)_{10} = (20122)_3$

$0.125 \times 3 = 0.375 \quad 0$

$0.375 \times 3 = 1.125 \quad 1$

$0.125 \times 3 = 0.325 \quad 0$

$0.375 \times 3 = 1.125 \quad 1$

$(125.125)_{10} = (20122.0101)_3$

$(125.125)_{10} = (?)_8$

| | |
|---|---|
| 8 | 125 |
| 8 | 15 5 |
| | 1 7 |

$(125)_{10} = (175)_8$

$0.125 \times 8 = 1.0 \quad 1$

$(125.125)_{10} = (175.1)_8$

$(10.16)_{10} = (?)_3$

| 3 | 10 |
|---|---|
| 3 | 1 |

$(10)_{10} = (31)_3$

$0.16 \times 3 = 0.48 \quad 0$

$0.48 \times 3 = 1.44 \quad 1$

$0.44 \times 3 = 1.32 \quad 1$

$0.32 \times 3 = 0.96 \quad 0$

$(10.16)_{10} = (31.0110)_3$

$(10.16)_{10} = (?)_8$

| 8 | 10 |
|---|---|
| 1 | 2 |

$(10)_{10} = (12)_8$

$0.16 \times 8 = 1.28 \quad 1$

$0.28 \times 8 = 2.24 \quad 2$

$0.24 \times 8 = 1.92 \quad 1$

$0.92 \times 8 = 7.36 \quad 7$

$(10.16)_{10} = (12.1217)_8$

$(10.16)_{10} = (?)_{16}$

$16 \mid 10 \; (A)$

$(10)_{10} = (A)_{16}$

$0.16 \times 16 = 2.56 \quad 2$

$0.56 \times 16 = 8.96 \quad 8$

$0.96 \times 16 = 15.36 \quad F$

$0.36 \times 16 = 5.76 \quad 5$

$(10.16)_{10} = (A.28F5)_{16}$ //