Department of Computer Science.

1MSC-CSA Digital logic and Computer Architecture

CIA-1

21.5

25

Consider last four digit of your register number is integer part & last 2 digit is a fraction part.

2044013

→ 7013.13

① Decimal to Binary

2	7013
2	3506 - 1
2	1753 - 0
2	876 - 1
2	438 - 0
2	219 - 0
2	104 - 1
2	52 - 0
2	26 - 0
2	13 - 0
2	6 - 1
2	3 - 0
	1 - 1

2	219 - 0
2	109 - 1
2	54 - 1
2	27 - 0
2	13 - 1
2	6 - 1
2	3 - 0
	1 - 1

B → O

H → B → H

4

1 1 0 1 1 0 1 1 0 0 1 0 1 . 0 0 1 0 0 0 0

0.13 × 2 = 0.26

0.26 × 2 = 0.52

0.52 × 2 = 1.04

0.04 × 2 = 0.08

0.08 × 2 = 0.16

0.16 × 2 = 0.32

0.32 × 2 = 0.64

0.64 × 2 = 1.28

$(.00100001)_2$

Department of Computer Science.

I MSC-CSA Digital logic and Computer Architecture

CIA-I

Consider last four digit of your register number is a integer part & last 2 digits is a fraction part.

2047013

→ 7013.13

① Decimal to Binary

Repetd

2 | 7013
2 | 3506 - 1
2 | 1753 - 0
2 | 876 - 1
2 | 438 - 0
2 | 219 - 0
2 | 104 - 1
2 | 52 - 0
2 | 16 - 0
2 | 23 - 0
2 | 11 - 1
2 | 5 - 1
2 | 2 - 1
1

2 | 219 - 0
2 | 109 - 1
2 | 54 - 1
2 | 27 - 0
2 | 13 - 1
2 | 6 - 1
2 | 3 - 0
1 - 1

1101101100101 . 00100001

0.13 × 2 = 0.26

0.26 × 2 = 0.52

0.52 × 2 = 1.04

0.04 × 2 = 0.08

0.08 × 2 = 0.16

0.16 × 2 = 0.32

0.32 × 2 = 0.64

0.64 × 2 = 1.28

7013.13 → $(1101101100101.00100001)_2$

② Decimal to octal

$(7013.13)_{10}$

8 | 7013
64

8 | 7013
8 | 876 - 5
8 | 109 - 4
8 | 13 - 5
1 - 5

4

$0.13 \times 8 = 1.04$

$0.04 \times 8 = 0.32$

$0.32 \times 8 = 2.56$

$0.56 \times 8 = 4.48$

$\therefore (15545.1024)_8$

③ Binary to decimal

1101101100101.00100001

$(1\times2^{12})+(1\times2^{11})+(0\times2^{10})+(1\times2^{9})+(1\times2^{8})+(0\times2^{7})+(1\times2^{6})$
$+(1\times2^{5})+(0\times2^{4})+(0\times2^{3})+(1\times2^{2})+(0\times2^{1})+(1\times2^{0})$

$(0\times2^{-1})+(0\times2^{-2})+(1\times2^{-3})+(0\times2^{-4})+(0\times2^{-5})+(0\times2^{-6})$
$(0\times2^{-7})+(1\times2^{-8})$

4

$4096 + 2048 + 0 + 512 + 256 + 0 + 64 + 32$
$+ 0 + 0 + 4 + 0 + 1 + 0 + 0 + 0.125 + 0 + 0 + 0 + 0$
$+ 0.0039$

7013.1289

$\Rightarrow (7013.13)_{10}$

(4) Octal to decimal

$(15545.1024)_8$.

$(1\times8)^4 + (5\times8)^3 + (5\times8)^2 + (4\times8)^1 + (5\times8)^0 +$

$(1\times8)^{-1} + (0\times8)^{-2} + (2\times8)^{-3} + (4\times8)^{-4}$

$4096 + (5\times512)^{2560} + (5\times64)^{320} + 32 + 1 +$

$0.125 + 0 + 2\times0.0019 + 4\times0.00024$

$7009 + 0.125 + 0.0038 + 0.00096$

7009.12976.

$7009.13_{//}$

II (1) Octal to binary.

15545.1024.

1	5	5	4	5	.	1	0	2	4
001	101	101	100	101		001	000	010	100

$(001101101100101.001000010100)_2$.

(2) Hexa

Do the arithmetic

① $(101001)_2$ / 11_2

```
      1101
11 ) 101001
     11
      100
       11
       0101
         11
         10
```

1

Q - $1101_{//}$

R - 10

② 1001 x 1111

```
       1001x1111
       ---------
         1001
        1001x
       1001xx
      1001xxx
     ----------
     10000111
```

1.5

$10000111_{//}$

③ 9's complement 678

1

678

```
  999
- 678
  ---
  321
```

9's → $321_{//}$

Scanned with CamScanner

→ 2's complement of $(1001001001)_2$

$$
\begin{array}{rr}
 & 1001001001 \\
1's & 0110110110 \\
\hline
 & +1 \\
\hline
 & 110110111 \\
\hline
\end{array}
$$

2's → 1101101111