

# **Number System**

**Important to CCC, O-LEVEL, ADCA &  
ALL Competitor Exam.**

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# Number System

Number system used to represent the computer data & Information.

## Four Types of Number System.

Number System	Used Digits	Base (Radix)	Number
Binary Number	0 - 1	2	$(11001010)_2$
Decimal Number	0 - 9	10	$(58470)_{10}$
Octal Number	0 - 7	8	$(46201)_8$
Hexadecimal Number	0 - F (15)	16	$(8FA01)_{16}$

Valid Number

$(100110)_2$

$(1001011)_8$

$(8745)_{10}$

$(B320)_{16}$

Invalid number

$(100400)_2$

$(87010)_8$

$(45AH0)_{16}$

$(450E0)_{10}$

# Number System Conversion

**Q.1**

**Binary to Decimal ?**

$$(100101)_2 = ?$$

$$\begin{array}{cccccc} 1 & 0 & 0 & 1 & 0 & 1 \\ 32 & 16 & 8 & 4 & 2 & 1 \end{array}$$

$$32 + 4 + 1 = 37$$

**Ans. (37)<sub>10</sub>**

Number	Table	Growth
1	2	1
2	4	2
3	6	4
4	8	8
5	10	16
6	12	32
7	14	64
8	16	128
9	18	256

## Q.2

# Decimal to Binary ?

$$(25)_{10} = ?$$

1 1 0 0 1

16 8 4 2 1

Ans.  $(11001)_2$

$$(54)_{10} = ?$$

1 1 0 1 1 0

32 16 8 4 2 1

Ans.  $(110110)_2$

Growth
1
2
4
8
16
32
64
128
256
512
1024
2048

### Q.3

## Binary to Octal ?

$$(10110011)_2 = ?$$

010 110 011  
2 6 3

Ans.  $(263)_8$

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$$(110010100101)_2 = ?$$

110 010 100 101  
6 2 4 5

Ans.  $(6245)_8$

Decimal	Binary
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111

**Q.4**

## Octal to Binary ?

$$(326)_8 = ?$$

**011 010 110**

**Ans.  $(11010110)_2$**

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$$(2531)_8 = ?$$

**010 101 011 001**

**Ans.  $(10101011001)_2$**

Decimal	Binary
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111

**Q.5**

## Binary to Hexadecimal ?

$$(10111010110)_2 = ?$$

0101 1101 0110

5 13 6

**Ans. (5D6)<sub>16</sub>**

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$$(11101100101010)_2 = ?$$

0011 1011 0010 1010

3 11 2 10

**Ans. (3B2A)<sub>16</sub>**

Decimal	Binary
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
<b>A—10</b>	1010
<b>B—11</b>	1011
<b>C—12</b>	1100
<b>D—13</b>	1101
<b>E—14</b>	1110
<b>F—15</b>	1111

**Q.6**

## Hexadecimal to Binary ?

$$(3F6)_{16} = ?$$

0011 1111 0110

Ans.  $(1111110110)_2$

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$$(A120)_{16} = ?$$

1010 0001 0010 0000

Ans.  $(1010000100100000)_2$

Decimal	Binary
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
A—10	1010
B—11	1011
C—12	1100
D—13	1101
E—14	1110
F—15	1111

**Q.7**

# Decimal to Octal ?

**Decimal  $\rightarrow$  Binary  $\rightarrow$  Octal**

$$(43)_{10} = ?$$

1 0 1 0 1 1

32 16 8 4 2 1

101 011

5 3

**Ans. (53)<sub>8</sub>**

$$(210)_{10} = ?$$

1 1 0 1 0 0 1 0

128 64 32 16 8 4 2 1

011 010 010

3 2 2

**Ans. (322)<sub>8</sub>**

**Q.8**

## Octal to Decimal ?

**Octal**  $\longrightarrow$  **Binary**  $\longrightarrow$  **Decimal**

$$(63)_8 = ?$$

110 011

1 1 0 0 1 1

32 16 8 4 2 1

$$32 + 16 + 2 + 1 = 51$$

**Ans. (51)<sub>10</sub>**

**Q.9**

# Decimal to Hexadecimal ?

**Decimal → Binary → Hexadecimal**

$$(43)_{10} = ?$$

1 0 1 0 1 1

32 16 8 4 2 1

0010 1011

2 11

**Ans. (2B)<sub>16</sub>**

$$(210)_{10} = ?$$

1 1 0 1 0 0 1 0

128 64 32 16 8 4 2 1

1101 0010

13 2

**Ans. (D2)<sub>16</sub>**

**Q.10**

## Hexadecimal to Decimal ?

Hexadecimal  $\rightarrow$  Binary  $\rightarrow$  Decimal

$$(6A3)_{16} = ?$$

0110 1010 0011

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

$$1024 + 512 + 128 + 32 + 2 + 1 = 1699 \quad \text{Ans. } (1699)_{10}$$

**Q.11**

## Octal to Hexadecimal ?

**Octal**  $\rightarrow$  **Binary**  $\rightarrow$  **Hexadecimal**

$$(63)_8 = ?$$

110 011

110011

0011 0011

3 3

**Ans. (33)<sub>16</sub>**

$$(542)_8 = ?$$

101 100 010

101100010

0001 0110 0010

1 6 2

**Ans. (162)<sub>16</sub>**

**Q.12**

## Hexadecimal to Octal ?

Hexadecimal  $\longrightarrow$  Binary  $\longrightarrow$  Octal

$$(A50)_{16} = ?$$

1010 0101 0000

101001010000

101 001 010 000

5 1 2 0

Ans.  $(5120)_8$

# Binary Addition

$$\begin{array}{r}
 \phantom{+} 11 \\
 \phantom{+} 1011 \\
 + 0110 \\
 \hline
 10001 \\
 \\
 \phantom{+} 1 \phantom{0} 1 \\
 \phantom{+} 1001 \\
 \phantom{+} 1100 \\
 + 0101 \\
 \hline
 11010
 \end{array}$$

A	B	C	Sum
0	+	0	0
0	+	1	1
1	+	0	1
1	+	1	10
1	+	1 + 1	11

$$\begin{array}{r}
 \phantom{+} 11 \\
 \phantom{+} 1111 \\
 \phantom{+} 11101 \\
 \phantom{+} 01100 \\
 \phantom{+} 10111 \\
 + 01011 \\
 \hline
 1001011
 \end{array}$$