

SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. :

1 why is binary number system used in digital system

- the binary number system is used in digital systems because the device is used in digital system operate in two states (on and off) and the signals have two levels which are conveniently represented using binary numbers.

2 what do you mean by 4 bit?

A binary digit is called bit.

3 How are negative numbers represented?

negative number can be represented in a sign-magnitude form or 1's complement form or 2's complement form.



SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No.

Q. 4

what do you mean by the sign magnitude form of representation?

The sign magnitude form of representation is one in which an addition bit along with the sign bit placed in front of numbers.

If sign bit is 0, the number is positive.

If sign bit is 1, the numbers are negative.

Q. 5

Enlist the type of number system within system any four

types of numbers

Range

base

Binary

0, 1

2

decimal

0 to 9

10

octal

0 to 7

8

Hexadecimal

0 to 15

16

SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. : 2

6 Convert the following binary number to decimal.

(i) $(1011)_2$

(ii) $(110.11)_2$

Ans :

(i)
$$\begin{array}{r} 1 \quad 0 \quad 1 \quad 1 \\ \times 2^3 \quad \times 2^2 \quad \times 2^1 \quad \times 2^0 \\ 8 + 0 + 2 + 1 \end{array}$$

$8 \times 1 + 4 \times 0 + 2 \times 1 + 1$

$8 + 0 + 2 + 1$

$(11)_10$

(ii) $(110.11)_2$

$$\begin{array}{r} 1 \quad 1 \quad 0 \quad 1 \quad 1 \\ \times 2^3 \quad \times 2^2 \quad \times 2^1 \quad \times 2^0 \quad \times 2^{-1} \quad \times 2^{-2} \\ 8 + 4 + 0 + 1 + \frac{1}{2} + \frac{1}{4} \end{array}$$

$8 \times 1 + 4 \times 1 + 2 \times 0 + 1 + \frac{1}{2} \times 1 + \frac{1}{4} \times 1$

$8 + 4 + 0 + 1 + 0.5 + 0.25$

$(13.75)_8$

प्र० ७

Convert decimal number to binary

$$(i) (37)_10$$

$$(ii) (105.25)_10$$

$$(i) (37)_10 :$$

$$(ii) (105.25)_10$$

2	37	1	105
2	18	0	52
2	9	1	25
2	4	0	13
2	2	0	6
1	1	1	3
			1

$$= (100101)_2$$

$$0.15 \times 2 = 0.3$$

$$0.3 \times 2 = 0.6$$

$$0.6 \times 2 = 1$$

$$0.12 \times 2 = 0 +$$

$$0.4 \times 2 = 0 +$$

$$0.8 \times 2 = 1 +$$

$$0.6 \times 2 = 1 +$$

$$= (1101001.001)_2$$

(36.81)

SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. : ...3.....

P.8

Convert following octal to binary.

(56267)8

$$5 \div 101$$

$$2 \div 010$$

$$6 \div 110$$

$$7 \div 111$$

$$= (10)010\ 110\ 111)_2$$

P.8

ज्ञान परम भूषणम्

Convert the following binary numbers to octal.

(1100 1010)2

011 001 010

3 1 2

= (312)8



SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No.

Q. 13

Convert $(64.51)_10 = (92)_2 = 9.28$

$$\begin{array}{r} 2 \ 64 \ 0 \\ 2 \ 32 \ 0 \\ 2 \ 16 \ 0 \\ 2 \ 8 \ 0 \\ 2 \ 4 \ 0 \\ 2 \ 2 \ 0 \\ 1 \end{array} \quad 0.51 \times 2 = 1 + 0.02$$

$$0.02 \times 2 = 0 + 0.04$$

$$0.4 \times 2 = 0 + 0.08$$

$$0.8 \times 2 = 0 + 0.16$$

$$0.16 \times 2 = 0 + 0.32$$

$$0.32 \times 2 = 0 + 0.64$$

$$0.04 \times 2 = 0 + 0.28$$

$$= (1000000.10000001)_2.$$

$$\begin{array}{r} 8 \ 64 \ 0 \\ 8 \ 8 \ 0 \\ 1 \ 1 \end{array} \quad 0.51 \times 8 = 4 + 0.08$$

$$0.08 \times 8 = 0 + 0.64$$

$$0.64 \times 8 = 5 + 0.12$$

$$0.12 \times 8 = 0 + 0.96$$

$$= (100.4050)_8.$$

$$0.51 \times 16 = 8 + 0$$

$$0.16 \times 16 = 2 + 0$$

$$0.56 \times 16 = 8 + 0$$

$$\begin{array}{r} 16 \ 64 \ 0 \\ 16 \ 4 \end{array}$$

$$(10.828)_{16}.$$

SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. : 5

Q.14

Add following binary numbers.

$$(i) 11011 + 1101 \quad (ii) 10111.101 + 110111.01$$

$$\begin{array}{r} 11011 \\ + 1101 \\ \hline 101000 \end{array} \quad \begin{array}{r} 10111.101 \\ + 110111.010 \\ \hline \del{1001110.111} \end{array}$$

$$(i) 101000$$

$$(ii) 1001110.111$$

सान परम भूमिका

Q.15

Subtract following binary numbers.

$$(i) 1011-101$$

$$\begin{array}{r} 1011 \\ - 101 \\ \hline 0110 \end{array}$$

$$(ii) 1100.10 - 111.01$$

$$\begin{array}{r} 1100.10 \\ - 111.01 \\ \hline 0111.01 \end{array} \quad \begin{array}{r} 1100.10 \\ - 111.01 \\ \hline 0101.01 \end{array}$$

$$(i) 0110$$



SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. :

Q. 16

Express (-65) in 8 bit 2's complement form

$$\begin{array}{r} 2 \ 65 \\ - 2 \end{array}$$

$$\begin{array}{r} 2 \ 32 \ 0 \\ - 2 \end{array}$$

$$\begin{array}{r} 2 \ 16 \ 0 \\ - 2 \end{array}$$

$$\begin{array}{r} 2 \ 8 \ 0 \\ - 2 \end{array}$$

$$\begin{array}{r} 2 \ 4 \ 0 \\ - 2 \end{array}$$

$$\begin{array}{r} 2 \ 2 \ 0 \\ - 2 \end{array}$$

$$\begin{array}{r} 1 \ 1 \ 1 \ 0 \\ - 1 \end{array}$$

$$65 = 1000001$$

Change into 8 bit.

$$(01000001)_2$$

Second's 2's

$$(10111111)_2$$

CMS =

$$(10111111)_8$$

SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. : 6

Q. 1

Convert following numbers BCD code.

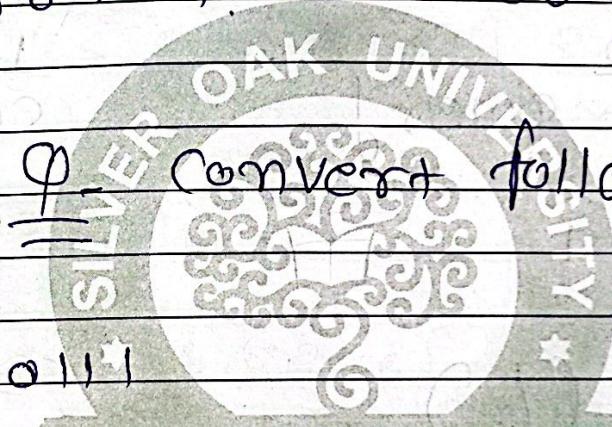
(i) 15_{10}

(ii) $(0.392)_{10}$

Ans.

00010101

00000111.10010010



Q. Convert following Ex-3 code

0100 0111

$$\begin{array}{r} 1 \rightarrow 000 \\ 3 \rightarrow 001 \\ \hline 0100 \end{array} \quad \begin{array}{r} 3 \rightarrow 001 \\ \times 3 \\ \hline 0100 \end{array} \quad \begin{array}{r} 0011 \\ 0011 \\ \hline 0100 \end{array}$$

$$\begin{array}{r} 4 \rightarrow 0100 \\ 3 \rightarrow 0011 \\ \hline 0111 \end{array}$$

$$\begin{array}{r} 6 \quad 0110 \\ 7 \quad \underline{0111} \\ \hline 1001 \end{array}$$



P. 1g

A Convert the following number from binary to gray code.

(i) 100

(ii) 1010

100

1100

convert query

1010

1101

convert On

1111

(6)

ज्ञान परमं भूषणम्

Convert query to Binary.

fig 1101 - (1101011)

11010

1000

1011

Ans :- 1001

Ans :- 1101

SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. :

7

Q. 20

Q) In an odd parity scheme
which of the following words
contains an error.

(i) 10110111

The number of 1's in the word is even (6) So this word have an error.

(ii) 11101010

The number of 1's in the word is odd (5) So this word has no error.



SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. :

(b)

in an even Parity Scheme
which of the following word
contains error.

(i) 10101010

the number of 1's in word
even so there is no error

(ii) 1011001

the number of 1's in the
word is odd so there is an
error

SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. : 8

Q. 2)

the message below coded in 7 bit Hamming code is transmitted through the noisy channel decoded in message assuming the most single error in data.

(i) 1110110 (ii) 1001001

P₁ P₂ D₃ P₄ D₅ D₆ D₇
1 1 1 0 1 1 0

P₁ = D₃ D₅ D₇ X (Error)
1 1 0

P₂ = D₃ D₆ D₇ X (Error)
1 1 1 0

P₄ = D₅ D₆ D₇ ✓ (Correct)
0 1 1 0

(011) \Rightarrow (3),₁₀



SILVER OAK UNIVERSITY

EDUCATION TO INNOVATION

Date : Page No. :

100 1001

$P_1 = D_3$ D_3 D_7 D_6 D_1

$P_1 = D_3$ D_3 D_7 ✓ (no error)

$P_1 = D_3$ D_6 D_7 ✓ (no error)

$P_4 = D_5$ D_6 D_7 ✓ (no error)

C101 → C22, 10