CS & IT ENGINEERING

DIGITAL LOGIC

NUMBER SYSTEM

Lecture No.3

By - CHANDAN SIR

Recap of Previous Lecture

Topic

Number System 02

01 Question Practice

02 Discussion

(NAT)

#Q. Consider the following represented series, $(2)_3$, $(3)_6$, $(12)_3$, $(12)_5$, $(14)_7$, $(111)_3$ ....., then the average value of first 10 number in decimal number system is _____.

$(2)_3 = (2\times 3^0)_{10} = (2)_{10}$

$(3)_6 = (3)_{10}$

$(12)_3 = (5)_{10}$

$(12)_5 = (7)_{10}$

$(14)_7 = (11)_{10}$

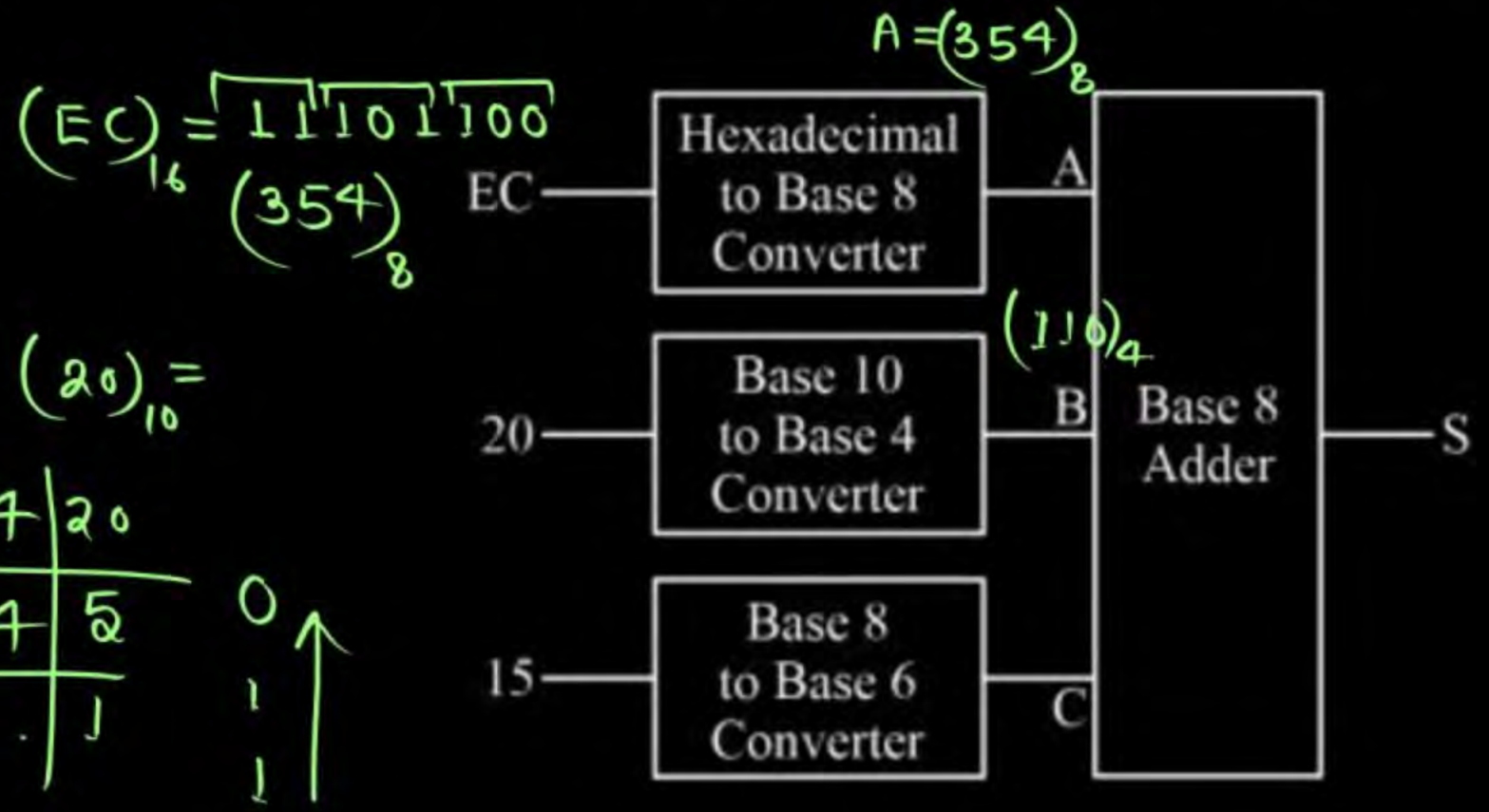
$(111)_3 = 9+3+1 = (13)_{10}$

$$\frac{2+3+5+7+11+13+17+19+23+29}{10}$$

$$= 12.9$$

(MCQ)

#Q. Consider the circuit given below:
The output of each converter is given to adder which adds them considering octal number. The output of adder is S. The value of S is ____.



(EC)16 = 1110 1100
(354)8

(20)10 =

4	20
4	5
	1

0
1
1

A $(480)_8$

B $(548)_8$

C $(485)_8$

D $(505)_8$

$(15)_8 = (\quad)_6$

$(15)_8 = (13)_{10} = (21)_6$

$$\begin{array}{r} 1 \\ 354 \\ 110 \\ 021 \\ \hline (505)_8 \end{array}$$

$8 = 10$

$9 = 11$

$10 = 12$

#Q:- $(123)_5 = (X8)_Y$

How many combination of X & Y will satisfy this equation?

(A) 2

(B) 3

(C) 4

(D) 5

$(123)_5 = (X8)_y$

$(1\times5^2+2\times5+3)_{10} = Xy+8$

$38 = Xy+8$

$X\cdot y = 30$

$y>8 \quad y>x$

X	y	
30	1	✓ ✓
1	30	
15	2	✓ ✓
2	15	
3	10	✓ ✓
10	3	
5	6	} × (y>8) ×
6	5	

#Q:- $(43)_8 = (x0)_y$

How many combination of x & y will satisfy this equation?

(A) 2
(B) 3
(C) 4
(D) 5

$(43)_8 = (x0)_y$ $\quad y > 2$

$(4 \times 8) + 3 = x \cdot y$

$35 = x \cdot y$

x	y	
1	35	✓
35	1	
5	7	✓
7	5	

(MCQ)

#Q. Which one of the following is the correct summation of numbers (in base 2) represented in the series $(3)_4$, $(5)_6$, $(14)_5$, $(15)_6$?

A. 11100

B. 11001

C. 11011

D. 10101

$(3)_4 = (3)_{10}$

$(5)_6 = (5)_{10}$

$(14)_5 = (9)_{10}$

$(15)_6 = (11)_{10}$

$(28)_{10}$

$(28)_{10} \rightarrow 11100$

(MCQ)

#Q. If p and q are successive numbers in a number system of base x such that $(pq)_x = (27)_9$ and $(qp)_x = (133)_4$, then

A. p= 4, q = 5 and x = 7

B. p= 4, q = 5 and x = 6

C. p= 3, q = 4 and x = 7

D. p= 3, q = 4 and x = 6

$p \quad q = p+1$

$(pq)_x = (27)_9$

$px + q = 25$ — ①

$px + p + 1 = 25$

$px + p = 24$

$7p + p = 24$

$p = 3$

$(qp)_x = (133)_4$

$qx + p = 31$ — ②

$(p+1)x + p = 31$

$px + p + x = 31$

$24 + x = 31$

$x = 7$

(NAT)

#Q. If $x = (4.4)_5$ and $y = (3.3)_5$, then $x + y = (a)_5$. The subscript 5 denotes the base on which the corresponding number is expressed. Then the value of a is_____.

$$\begin{array}{r} 1 \\ 4.4 \\ 3.3 \\ \hline (13.2)_5 \end{array}$$

$a = 13.2$

Ans

$(5)_{10} = (10)_5$

$(6)_{10} = (11)_5$

$(7)_{10} = (12)_5$

$(8)_{10} = (13)_5$

$(9)_{10} = (14)_5$

$(10)_{10} = (20)_5$

(MSQ)

#Q. Consider the following equation,

$$\left(\frac{422}{21.1}\right) = 20$$

The base value which can satisfy the above equation is _____.

A Base=4

B Base =6

C Base =7

D Any base value ≥ 4 ×

(B, C)

$(422)_x = (21.1)_x (20)_x$ (x ≠ 4)

$\frac{4x^2+2x+2}{2x+1+\frac{1}{x}} = 2x$

$4x^2+2x+2 = 4x^2+2x+2$ ∀ x

x ≠ 4

x ≠ 4

x ≠ 4

(MCQ)

#Q. Find the result in 2's complement form of the following $(1211)_4 + (1121)_3$

A. 010010000

B. 111100000

C. 011110000

D. 001110000

$x = (1211)_4 \rightarrow (\ )_{10}$

$y = (1121)_3 \rightarrow (\ )_{10}$

$x+y\ (144)_{10} = 10010000$

$= \underline{010010000}$

(MCQ)

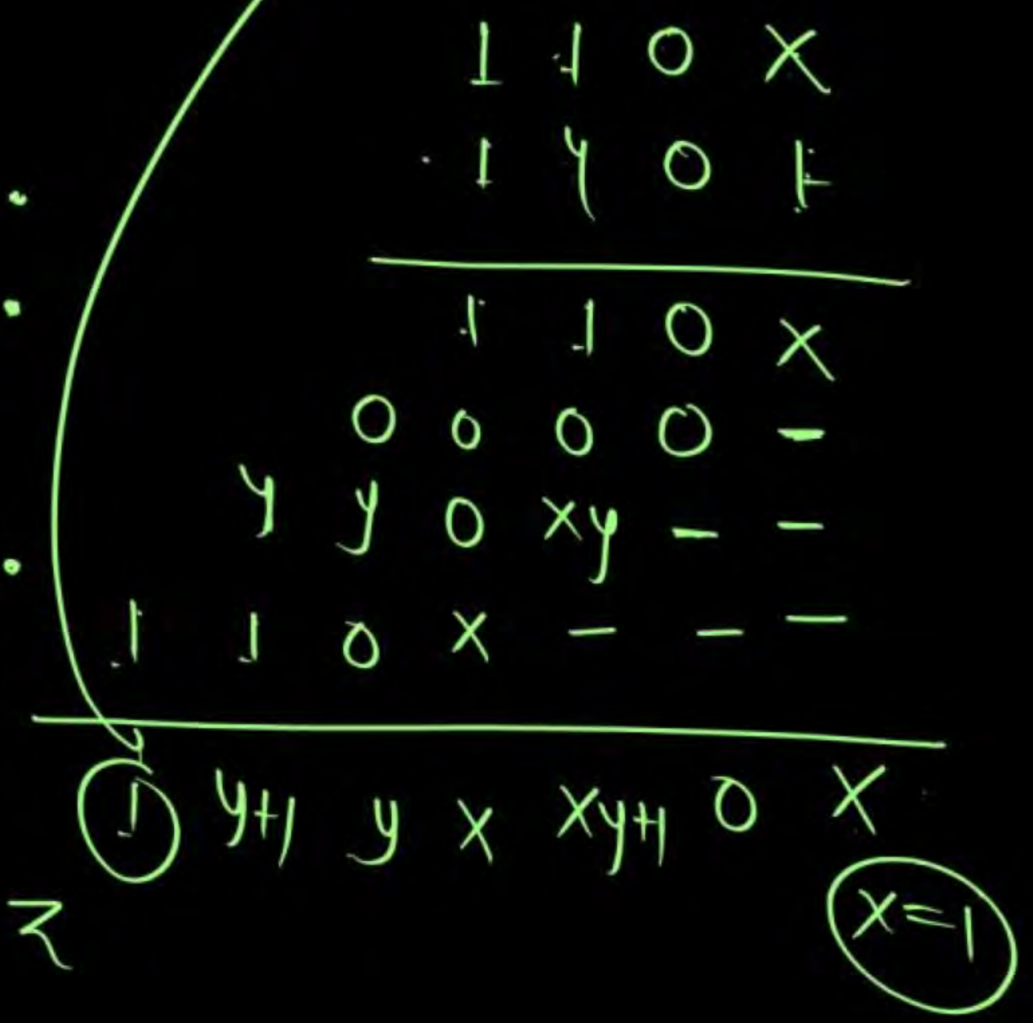
#Q. Consider the following multiplication operation of unsigned binary numbers. $(110X) \times (1Y01) = (Z110101)_2$. The appropriate values of X, Y and Z are

A. X = 0, Y = 1 and Z = 1

B. X = 1, Y = 0 and Z = 1

C. X = 1, Y = 0 and Z = 0

D. X = 0, Y = 0 and Z = 1



2 mins Summary

Topic One Number System

Topic Two

Topic Three

Topic Four

Topic Five

Thank you DOSTO