EE, EC, CS & IT ENGINEERING

Digital Logic
Number System

BASE CONVERSION

DPP Solution 01

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01 Questions

02 Discussion

Q.1 The two addition operations 24 + 14= 41 and 23 + 12 = 101 are performed on number bases b_1 and b_2 respectively. The values of b_1 and b_2 are respectively

A. 7 and 4

B. 4 and 7

C. 8 and 4

D. 4 and 8

$(24)_{b_1} + (14)_{b_1} = (41)_{b_1}$

$2b_1 + 4 + b_1 + 4 = 4b_1 + 1$

$b_1 = 7$

$(23)_{b_2} + (12)_{b_2} = (101)_{b_2}$

$2b_2 + 3 + b_2 + 2 = b_2^2 + 1$

$b_2^2 - 3b_2 - 4 = 0$

$b_2 = \frac{3 \pm \sqrt{9+16}}{2}$

$b_2 = \frac{3 \pm 5}{2} = 4$

Q.2 If x and y are successive numbers in a number system of base b such that $(xy)_b = (25)_{10}$ and $(yx)_b = (31)_{10}$, then

A. x = 4, y = 5 and b = 7

B. x = 3, y = 4 and b = 6

C. x = 4, y = 5 and b = 6

D. x = 3, y = 4 and b = 7

$x \times b^1 + y \times b^0 = 25$

$xb + y = 25$

$3 \times 7 + 4$

$21 + 4 = 25$

$yb + x = 31$

$4 \times 7 + 3$

$28 + 3$

31

Q.3 If $a = (4.4)_5$ and $b = (3.3)_5$, then $a + b = (x)_5$. The subscript 5 denotes the base on which the corresponding number is expressed. The value of x is

A. 31.2

B. 7.2

C. 8.7

D. 13.2

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

$$\begin{array}{r} 87 \\ 25 \\ \hline 112 \end{array}$$

$$\begin{array}{r} 11 \\ 19 \\ \hline 30 \end{array}$$

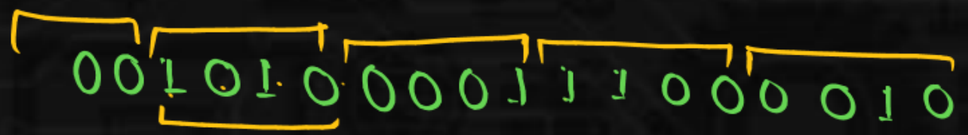
Q.4 If $(X\ 1CY)_{16} = (120702)_8$, then X and Y are

A. A and 2

B. B and 1

C. l and B

D. 2 and A



$(A\ 1\ C\ 2)_{16}$

X 1 C Y

X = A Y = 2

Q.5 Given $(135)_b + (144)_b = (323)_b$ where subscript b denotes the base on which numbers are expressed. What is value of b ?

A. 4

B. 5

C. 6

D. 7

$$(135)_b + (144)_b = (323)_b$$

$$b^2+3b+5 + b^2+4b+4 = 3b^2+2b+3$$

$$b^2-5b-6=0$$

$$b = \frac{5 \pm \sqrt{25+4\times6}}{2}$$

$$b = \frac{5 \pm \sqrt{25+16}}{2}$$

$$b = \frac{5 \pm 7}{2}$$

$$b = \frac{12}{2} = 6$$

Q. 6 In a digital computer, binary subtraction is performed

A. In the same way as we perform subtraction in decimal number system

B. Using two's complement method

C. Using 9's complement method.

D. Using 10's complement

A + (-B)

Q. 7

The greatest negative number, which can be stored in a computer that has 8-bit word length and uses 2's complement arithmetic, is

A. -256

B. -255

C. -128

D. -127

Range $= -[2^{n-1}]$ to $+[2^{n-1}-1]$

$= -[2^{8-1}]$ to $[2^{8-1}-1]$

$= -2^7$ to $\{2^7-1\}$

$= -128$ to $+127$

Q.8 F's complement of $(2BFD)_{hex}$ is

A. E304

B. D403

C. D402

D. C403

F F F F
− 2 B F D
D 4 0 2

15

A=10
B=11
C=12
D=13 ✓
E=14
F=15

Q.9

The result of addition operation 34 + 43 performed on minimum base is stored in an 8-bit register. The content of register will be

A. 01000011

B. 00101010

C. 01010101

D. 01010100

$(34)_5 + (43)_5$

$[3\times5^1+4\times5^0] + [4\times5^1+3\times5^0]$

$15+4+20+3$

$19+23 = 42$

32 16 8 4 2 1

0 0 1 0 1 0 1 0

Q.5 Which of the following is equal to $(AB)_{16}$?

A. $(B7)_{16} - (A)_{16}$

B. $(B5)_{16} - (A)_{16}$

C. $(A0)_{16} + (D)_{16}$

D. $(BA)_{16} + (01)_{16}$

$$\begin{array}{r} 1\,0\,1\,1\,1\,0\,1\,0\,1 \\ -\;0\,0\,0\,0\,1\,0\,1\,0 \\ \hline 1\,0\,1\,0\,1\,0\,1\,1 \end{array}$$

A B

$(AB)_{16}$

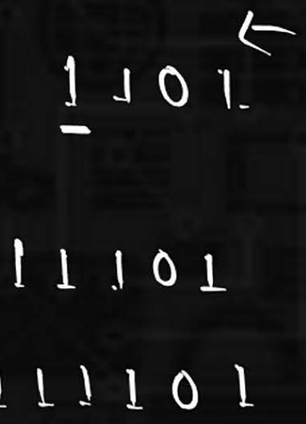
Q.11 An equivalent 2's complement representation of the 2's complement number 1101 is

A. 110100

B. 001101

C. 110111

D. 111101



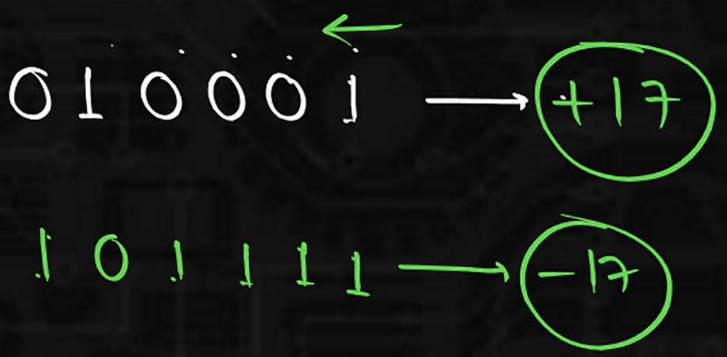
Q.12 The 2's complement representation of –17 is

A. 101110

B. 101111

C. 111110

D. 110001



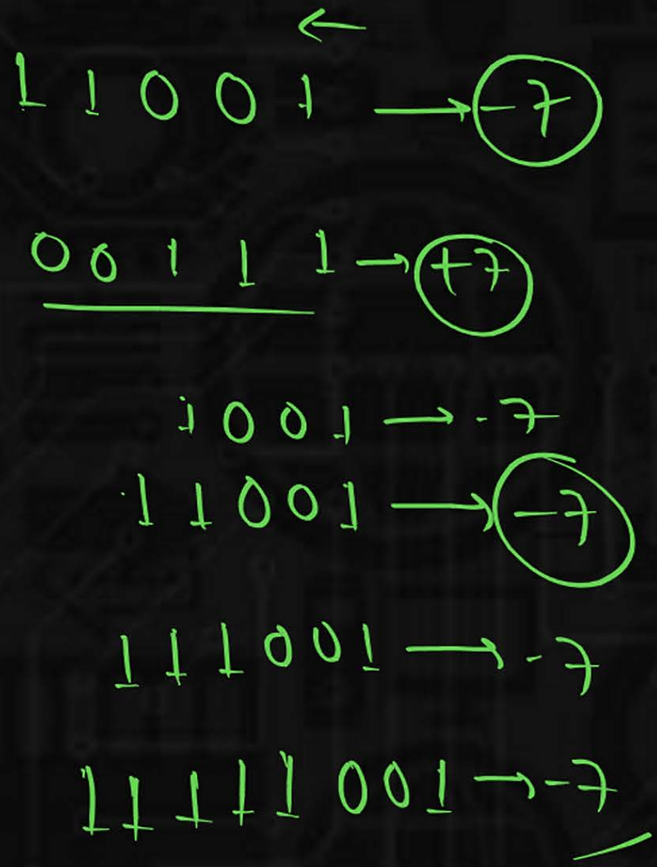
Q.13 11001, 1001 and 111001 correspond to the 2's complement representation of which one of the following sets of number?

A. 25.9 and 57 respectively

B. –6, –6 and –6 respectively

C. –7, –7 and -7 respectively

D. –25, –9 and –57 respectively



Q. 14

X = 01110 and Y = 11001 are two 5-bit binary numbers represented in two's complement format The sum of X and Y represented in two's complement format using 6 bits is

A. 100111

B. 001000

C. 000111

D. 101001

$X = 01110 = +14$

$Y = 11001 = -7$

$+7$

000111


THANK YOU GW
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