

Ans: to the question no. 7

18-38001-2

Ruhul Anon

(a) (234)₁₀

$$\begin{array}{r}
 2 \overline{) 234} \\
 \underline{2} 117 - 0 \\
 2 58 - 1 \\
 2 29 - 0 \\
 14 - 1 \\
 2 7 - 0 \\
 3 - 1 \\
 2 1 - 1 \\
 0 - 1
 \end{array}$$

$$\Rightarrow (11101010)_2$$

$$\Rightarrow \underline{0000000011101010}$$

$$\Rightarrow (00EA)_h$$

(b) (16)₁₀

$$\begin{aligned}
 (16)_{10} &= (00000000010000)_2 \\
 &= (0000000000010000)_2
 \end{aligned}$$

$$-(16)_{10} \rightarrow 2's \text{ complement}$$

$$-(16)_{10} = (111111110111)_2 \text{ (2's com)}$$

$$= 111111110111 + 1$$

$$\begin{array}{r}
 \underline{11111111110000}_2 \\
 2's \text{ (complement)}
 \end{array}$$

$$-(16)_{10} = (1111111110000)_2$$

$$= (FFFO)_h$$

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$$(c) (31634)_d = (11110110010010)_2$$

$$(d) -32216_{10}$$

$$= (01110110010010)_2$$

$$= (011101101000)_2$$

$$= (2B92)_{16}$$

$$= 1000001000100111$$

$$+ 1$$

$$= (8228)_{16}$$

Ans. to the question no-8

$$(a) 10110100 - 10010111$$

$$(b) 10001011 - 11110111$$

$$2's \text{ complement for } (-10010111)_2$$

$$2's \text{ comp for } (-11110111)_2$$

$$1's \text{ n} \rightarrow 0000000011110111$$

$$1's \text{ n} \rightarrow 0000000010010111$$

$$+ 1$$

$$2's \text{ -comp } (11111110101001)_2$$

$$+ 10110100$$

$$\text{Positive } \rightarrow (000000000011101)_2$$

$$= (11101)_2$$

$$2's \text{ comp } (11111110001001)_2$$

$$+ 10001011$$

$$\text{negative } \rightarrow (11111110010100)_2$$

$$1's \text{ comp } 0000000001101011$$

$$+ 1$$

$$2's \text{ comp } (00000000101100)_2$$

$$= (-110100)_2$$

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(C) $(FE0F - 12AB)_{16}$

(D) $(1ABC - B3EA)_{16}$

2's comp for $(-12AB)_{16}$

2's comp for $(-B3EA)_{16}$

$12AB = 0001001010101011$

$B3EA = 101100111101010$

1's comp $\rightarrow 1110110101010100$

1's comp $\rightarrow 0100110000010101$

+

+

2's comp $\rightarrow (1110110101010101)_2$

2's comp $\rightarrow (0100110000010110)_2$

$= (4E16)_{16}$

$= (ED55)_{16}$

$1ABC = 0001101010111100$

$FE0F = 1111110000001111$

$4E16 = 0100110000010110$

$ED55 = 1110110101010101$

$(0110011011010010)_2$

01110101101100100

$= (66D2)_{16}$

negative number

$= (FB64)_{16}$

2's complement for

$(66D2)_{16}$

$= (-992E)_{16}$

Ans: to the question no- (9)

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(a) $(\text{XFFE})_{16} = 0111111111111100 \rightarrow 16\text{-bit}$
 \rightarrow MSB is 0, so, this is unsigned msb.

$$= (32766)_{10} \rightarrow \text{unsigned}$$

$$= (32766)_{10} \rightarrow \text{signed}$$

(b) $(8543)_{16} = 1000010101000011_2$
 \rightarrow MSB signed bit

$$(8543)_{16} = (8 \times 16^3) + (5 \times 16^2) + (4 \times 16^1) + (3 \times 16^0)$$

$$= (34115)_{10}$$

$$(8543)_{16} = 1000010101000011$$

$$= 0111101010111100 \rightarrow 1's \text{ complement}$$

 $+ 1$

$$= 0111101010111101$$

$$\rightarrow 2's \text{ complement}$$
$$= (0 \times 2^{15}) + (1 \times 2^{14}) + (1 \times 2^{13}) + (1 \times 2^{12}) + (1 \times 2^{11}) + (0 \times 2^{10}) + (1 \times 2^9) + (0 \times 2^8) + (1 \times 2^7) + (0 \times 2^6) + (1 \times 2^5) + (1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$$

$$= (-31421)_{10}$$

(c) $(FE)_{16}$

$$= (1111110)_2$$

$$= (2 \times 16^1) + (14 \times 16^0)$$

$$= (254)_{10} \rightarrow \text{unsigned}$$

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18-580012

$$(FE)_{16} = 1111110$$

$$= 00000001 \rightarrow 1's \text{ complement}$$

$$+ 1$$

$$\hline 00000010 \rightarrow 2's \text{ complement}$$

$$= (-2)_{10}$$

(d) $(7F)_{16} = (0111111)_2$

$$= (2 \times 16^1) + (15 \times 16^0)$$

$$= (127)_{10} \rightarrow \text{unsigned}$$

$$= (127)_{10} \rightarrow \text{signed}$$

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Ans. to the question no. (10)

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(a) $(120)_{10} = (0000000001111000)_2 \rightarrow 16\text{-bits}$

$= (01111000)_2 \rightarrow 8\text{-bits}$

$(-120) = 10000111 \rightarrow 1's \text{ comp.}$
 $+ 1$

$\underline{10001000} \rightarrow 2's \text{ comp. for 8-bits}$

$(-120) = (111111110000111)_2 \rightarrow 1's \text{ comp. for 16-bits}$
 $+ 1$

$\underline{111111110001000} \rightarrow 2's \text{ comp.}$

Ans: to the question no. 11

12-3800-23

(a) $(32767)_{10} = (11111111111111)_2 \rightarrow$ for 16-bit

$= (x: \text{too big}) \rightarrow$ for 8-bit

(b) $(-40000)_{10} = (x: \text{too big}) \rightarrow$ for 16-bit

$= (x: \text{too big}) \rightarrow$ for 8-bit

(c) $(65536)_{10} = (x: \text{too big}) \rightarrow$ for 16-bit

$= (x: \text{too big}) \rightarrow$ for 8-bit

(d) $(252)_{10} = (0000000010000000)_2 \rightarrow$ for 16-bit

$= (x: \text{too big}) \rightarrow$ for 8-bit

(e) $(-128)_{10} = (0000000010000000)_2 \rightarrow$ for 16-bit

$= (10000000)_2 \rightarrow$ for 8-bit

Ans: to the question no (12)

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if $msb = 0$ then it is positive
other wise negative

a) 1010010010010100
 $\rightarrow msb = 1 \rightarrow$ negative

b) $(78E3)_{16} = (0111100011010011)_2$
 $\rightarrow msb = 0 \rightarrow$ positive

c) $(CBB3)_{16} = (1100101100110011)_2$
 $\rightarrow msb = 1 \rightarrow$ negative

d) $(807F)_{16} = (1000000001111111)_2$
 $\rightarrow msb = 1 \rightarrow$ negative

e) $(9ACE)_{16} = (1001101011000100)_2$
 $\rightarrow msb = 1 \rightarrow$ negative