Ziyi (Jason) Lan

1. $91_{10} + C6_{16}$

$91_{10} = 64+16+8+2+1$

$\therefore 91_{10} = 1011011_2$

$C6_{16} = 1100\ 0110_2$

$$\begin{array}{r} 01011011 \\ +\ 11000110 \\ \hline 100100001 \end{array}$$

$\therefore 91_{10} + C6_{16} = \boxed{00100001_2}$ unsigned

2. $11_8 - 11_{10}$

$11_8 = 1001_2 \quad 11_{10} = 8+2+1 = 1011_2$

$1011_2 \rightarrow 0100_2 \rightarrow 0101_2$

$1001_2 + 0101_2 = \boxed{1110_2}$ ~~unsigned~~ signed

3. $12.3125_{10} + 0110_{I2Q2}$

$12.3125_{10} = 1100.0101_{U4Q4}$

$$\begin{array}{r} 11000101 \\ +\ 00011000 \\ \hline 11011101 \end{array}$$

$\therefore \boxed{1101.1101_{U4Q4}}$

4. $5.75_{10} - 7.125_{10}$

$5.75_{10} = 0101.110_{I4Q3}$

$7.125_{10} = 0111.001_{I4Q3}$

$0111001 \rightarrow 1000110 \rightarrow 1000111$

$$\begin{array}{r} 01011110 \\ +\ 10001111 \\ \hline 11101101 \end{array}$$

$\therefore \boxed{1110.101_{I4Q3}}$

5. $9_{10} \cdot 3_{10}$

$9_{10} = 1001_2 \quad 3_{10} = 0011_2$

$$\begin{array}{r} 1001 \\ \times\ 0011 \\ \hline 1001 \\ 1001 \\ \hline 11011 \end{array}$$

$\therefore \boxed{1101_2}$ Unsigned

6. $(-5)_{10} \cdot (-6)_{16}$

$(-5)_{10} = 1011 \quad (-6)_{16} = 1010$

$1011 \rightarrow 1101 \quad 1010 \rightarrow 1101$

$$\begin{array}{r} 11011 \\ \times\ 11010 \\ \hline 00000\ 0000 \\ 11111011 \\ 00000000 \\ 1101100 \\ 110110 \\ \hline 1011.1110 \end{array}$$

$\therefore \boxed{1111_2}$

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7. $9.5_{10} \times 2.625_{10}$

$9.5_{10} = 1001.100$ U4Q3 $\quad 2.625 = 10.101$ U2Q3

$$\begin{array}{r} 1001.100 \\ \times\ 10.101 \\ \hline 1001.100 \\ 1001.100 \\ 1001.100 \\ \hline 11000.111100 \end{array}$$

$\therefore 11000.111100$ $U_5 Q_6$

8. $(-1.25)_{10} \times 3.5_{10}$

$-1.25_{10} = 11101_2$ I4Q2

$3.5_{10} = 00011.10_2$ I4Q2

$$\begin{array}{r} 111.011 \\ \times\ 11.10 \\ \hline 1111.0110 \\ 111.011 \\ 111.011 \\ \hline 1001.1.1010 \end{array}$$

$\therefore 10.11.10_2$
I4Q4