

Q1:

$$01101010$$

$$\begin{aligned} &\rightarrow (1 \cdot 2^1) = 2 \\ &\rightarrow (1 \cdot 2^3) = 8 \\ &\rightarrow (1 \cdot 2^5) = 32 \\ &\rightarrow (1 \cdot 2^6) = 64 \end{aligned}$$

$$\boxed{106_2}$$

Q6:

$$11011010 \text{ signed number.}$$

$$\begin{aligned} &\rightarrow 2 \\ &\rightarrow 8 \\ &\rightarrow 16 \\ &\rightarrow 64 \\ &\rightarrow -128 \end{aligned}$$

$$\boxed{-38_{10}}$$

Q2:

$$\begin{array}{cccc} 0001 & 0010 & 1010 & 1101 \\ 1 & 2 & 10 & 13 \end{array} \Rightarrow \boxed{12AD}$$

$$\begin{array}{cccccc} 10 & 11 & 12 & 13 & 14 & 15 \\ A & B & C & D & E & F \end{array}$$

Q3:

$$0x123456$$

$(4 \cdot 6) = 24$ - bits since there are 4-bits for each hex digit.

Q4:

1-byte = 8 bits
 50-bits / 8 bits ≈ 6.25 bytes
 meaning that a 50-bit number requires 7-bytes of memory to be stored.

Q5:

$$200_{10} = 11001000_2$$

$$\begin{array}{cccccc} 1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 \end{array}$$

$$\begin{array}{r} 128 \\ 64 \\ 8 \\ \hline 200 \end{array}$$

$$\begin{array}{cc} 1100 & 1000 \\ \hline 12 & 8 \\ C & \end{array} \Rightarrow \boxed{0xC8}$$

$$(12 \times 16^1) + (8 \times 16^0)$$

$$192 + 8$$

$$\boxed{200}$$

$$Q7: 23_{10} = ?_8$$

$$00010111$$

$$23_{10} = 10111_2$$

$$\begin{array}{r} 010111 \\ (2 \cdot 8^1) + (7 \cdot 8^0) = 23 \end{array}$$

$$\Rightarrow \boxed{23_{10} = 27_8}$$

Q8:

$$-54_{10} = 11001010_2$$

$$54_{10} = 00110110_2$$

$$\begin{array}{r} 2 \\ 4 \\ 16 \\ 32 \\ \hline 54_{10} \end{array}$$

Two's complement
 11001001

$$\boxed{11001010_2}$$

Q9:

$$11.11_2 = \frac{3.75}{10}$$

$$\begin{array}{r} 11.11 \\ \rightarrow 1 \cdot 2^{-2} = \frac{1}{2^2} = 0.25 \\ \rightarrow 1 \cdot 2^{-1} = \frac{1}{2^1} = 0.5 \\ \rightarrow 1 \cdot 2^0 = 1 \\ \rightarrow 1 \cdot 2^1 = 2 \end{array}$$

$$\boxed{3.75_{10}}$$

Q10:

$$10_{10} = 00010000_{BCD}$$

$$\begin{array}{r} 1010 \\ \hline 2 \\ 8 \\ \hline 10_{10} \end{array}$$

$$\boxed{00010000_{BCD}}$$

Binary Coded Decimal
 For every bit of decimal, we need to write 2 bit binary conversion

$$\begin{array}{cc} 1 & 0 \\ \downarrow & \downarrow \\ 0001 & 0000 \end{array}$$