

$$1) a) (28)_{10} \Rightarrow \begin{array}{l} 28/2 = 14 \\ 14/2 = 7 \\ 7/2 = 3 \\ 3/2 = 1 \\ 1/2 = 0 \end{array}$$

$$(28)_{10} = (11100)_2$$

Rem
0
0
1
1
1

R
1
0
1
0
0

$$b) (261)_{10} \Rightarrow \begin{array}{l} 261/2 = 130 \\ 130/2 = 65 \\ 65/2 = 32 \\ 32/2 = 16 \\ 16/2 = 8 \\ 8/2 = 4 \\ 4/2 = 2 \\ 2/2 = 1 \\ 1/2 = 0 \end{array}$$

$$(261)_{10} = (100000101)_2$$

R
1
0
1
0
0
0
0
0
1

$$c) (20580)_{10} \Rightarrow \begin{array}{l} 20580/2 = 10290 \\ 10290/2 = 5145 \\ 5145/2 = 2572 \\ 2572/2 = 1286 \\ 1286/2 = 643 \\ 643/2 = 321 \\ 321/2 = 160 \\ 160/2 = 80 \\ 80/2 = 40 \\ 40/2 = 20 \\ 20/2 = 10 \\ 10/2 = 5 \\ 5/2 = 2 \\ 2/2 = 1 \\ 1/2 = 0 \end{array}$$

$$(20580)_{10} = (101000000100100)_2$$

R
0
0
1
0
0
1
1
0
0
0
0
0
1
0
1

$$\begin{aligned}
 2) 1019_{10} &\Rightarrow 1019/2 = 509 \\
 &509/2 = 254 \\
 &254/2 = 127 \\
 &127/2 = 63 \\
 &63/2 = 31 \\
 &31/2 = 15 \\
 &15/2 = 7 \\
 &7/2 = 3 \\
 &3/2 = 1 \\
 &1/2 = 0
 \end{aligned}$$

$$\begin{array}{r}
 R \\
 \hline
 1 \\
 1 \\
 0 \\
 1 \\
 1 \\
 1 \\
 1 \\
 1 \\
 1 \\
 1 \\
 1
 \end{array}$$

$$(1019)_{10} = (\underbrace{0011}_① \underbrace{1111}_② \underbrace{1011}_③)_2$$

$$① = 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 = 3$$

$$② = 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 = 15 = F_{16}$$

$$③ = 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 = 11 = B_{16}$$

$$= 3FB_{16}$$

$$3) a) (\underbrace{1100}_① \underbrace{1101}_②)_2$$

$$\text{Hex } ① = 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0 = (12)_{10} = (C)_{16}$$

$$② = 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 13 = (D)_{16}$$

$$\begin{aligned}
 \text{Dec } &\Rightarrow 1 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 \\
 &= 128 + 64 + 0 + 0 + 8 + 4 + 0 + 1 \\
 &= 205_{10}
 \end{aligned}$$

$$(1100 \ 1101)_2 = (CD)_{16} = (205)_{10}$$

$$b) (\underbrace{10}_① \underbrace{1010}_② \underbrace{1001}_③)_2$$

$$① = 1 \times 2^1 + 0 \times 2^0 = 2_{16}$$

$$\text{Hex: } ② = 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 = 10 = A_{16}$$

$$③ = 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 9_{16}$$

$$\begin{aligned}
 \text{Dec: } &1 \times 2^9 + 0 \times 2^8 + 1 \times 2^7 + 0 \times 2^6 + 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 \\
 &= 512 + 0 + 128 + 0 + 32 + 8 + 1 \\
 &= 681_{10}
 \end{aligned}$$

$$(10 \ 1010 \ 1001)_2 = (2A9)_{16} = (681)_{10}$$

$$\begin{aligned}
 4) \ a) \ (11\ 0011.01)_2 &= 1 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 + 0 \times 2^{-1} + 1 \times 2^{-2} \\
 &= 32 + 16 + 0 + 0 + 2 + 1 + 0 + \frac{1}{4} \\
 &= (51.25)_{10}
 \end{aligned}$$

$$\begin{aligned}
 b) \ (10101010.1)_2 &= 1 \times 2^7 + 0 \times 2^6 + 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 + 1 \times 2^{-1} \\
 &= 128 + 0 + 32 + 0 + 8 + 0 + 2 + 0 + \frac{1}{2} \\
 &= (170.5)_{10}
 \end{aligned}$$