1. Floating Point Addition and Subtraction

i) 01001010 + 10010100

$01001010 = 1.001010 \times 2^6 = 0.1001010 \times 2^7$

$10010100 = 1.0010100 \times 2^7$

$$
\begin{array}{llllllll}
 & 0 . & 1 & 0 & 0 & 1 & 0 & 1 & 0 & & & \times 2^7 \\
+ & 1 . & 0 & 0 & 1 & 0 & 1 & 0 & 0 & & & \times 2^7 \\
\hline
 & 1 . & 1 & 0 & 1 & 1 & 1 & 1 & 0 & & & \times 2^7
\end{array}
$$

$$= 1.1011110 \times 2^7$$

ii) 01010011 + 10100100

$01010011 = 1.010011 \quad \times 2^6 = 0.1010011 \times 2^7$

$10100100 = 1.0100100 \quad \times 2^7$

$$
\begin{array}{llllllll}
 & 0 . & 1 & 0 & 1 & 0 & 0 & 1 & 1 & \times 2^7 \\
+ & 1 . & 0 & 1 & 0 & 0 & 1 & 0 & 0 & \times 2^7 \\
\hline
 & 1 . & 1 & 1 & 1 & 0 & 1 & 1 & 1 & \times 2^7
\end{array}
$$

$$= 1.1110111 \times 2^7$$

iii) 00100100 + 10010010

$00100100 = 1.00100 \quad \times 2^5 = 0.0100100 \times 2^7$

$10010010 = 1.0010010 \times 2^7$

$$
\begin{array}{llllllll}
 & 0 . & 0 & 1 & 0 & 0 & 1 & 0 & 0 & \times 2^7 \\
+ & 1 . & 0 & 0 & 1 & 0 & 0 & 1 & 0 & \times 2^7 \\
\hline
 & 1 . & 0 & 1 & 1 & 0 & 1 & 1 & 0 & \times 2^7
\end{array}
$$

$$= 1.0110110 \times 2^7$$

iv) 0000ll0l + 0000ll11

$$0000\,ll\,0l = 1.10l \times 2^3$$
$$0000\,ll\,ll = 1.1ll \times 2^3$$

$$
\begin{array}{r}
1.\;1\;0\;1 \quad \times 2^3 \\
+\quad 1.\;1\;1\;1 \quad \times 2^3 \\
\hline
11.\;1\;0\;0 \quad \times 2^3 \\
\end{array}
$$

$$= 1.1100 \times 2^4$$

v) 10010011 + 10101100

$$10010011 = 1.0010011 \times 2^7$$
$$10101100 = 1.0101100 \times 2^7$$

$$
\begin{array}{r}
1.\;0\;0\;1\;0\;0\;1\;1 \quad \times 2^7 \\
+\quad 1.\;0\;1\;0\;1\;1\;0\;0 \quad \times 2^7 \\
\hline
10.\;0\;1\;1\;1\;1\;1\;1 \quad \times 2^7 \\
\end{array}
$$

$$= 1.00111111 \times 2^8$$

2. Floating Point Multiplication and Division

i) 5.66015625 × 8.59375

$$5.66015625 = 101.10101001$$
$$8.59375 = 1000.10011 \qquad \times$$
$$\rule{6cm}{0.4pt}$$
$$110000.10100100010\,1011$$

$$= 1.1000010100010001011 \times 2^5$$

ii) -6.18×5.796875

$-6.18 = -110.0010111\ 000010101001$

$5.796875 = 101.110011$ $\quad\times$

$= -1000111101\ 0011\ 000111\ 11\ 0\ 110101$

$= -1.000111101001100011110110101 \times 2^{5}$

iii) $-2.27734375 / 1.154375$

$-2.27734375 = 10.01000111$ $\quad\div$

$1.154375 = 1.00100111\ 10000101001$

$= 1.1111100100000100\ 1$

$= 1.1111\ 100100000100\ 1 \times 2^{0}$

iv) $4.8828125 / 1.768$

$4.8828125 = 100.1110001$ $\quad\div$

$1.768 = 1.110001\ 001001101110\ 1$

$= 10.11000011\ 00000011\ 1$

$= 1.011000011000000111 \times 2^{1}$