

Q1. 256 128 64 32 16 8 4 2 1

(a) 1 0 0 1 1 0 1 0 1 . 1 0 1 0

$$256 + 32 + 16 + 4 + 1 + 0.5 + 0.125 \Rightarrow 309.625 \text{ (Ans)}$$

(b) 1 0 1 1 1 0 0 1 . 1 1 0 1 1

$$128 + 32 + 16 + 8 + 1 + 0.5 + 0.25 + 0.0625 + 0.03125 \Rightarrow 185.84375 \text{ (Ans)}$$

Q2.

(a) 6 3 . 3 4 5 6

64 32 16 8 4 2 1 0.5

1 1 1 1 1 1 . 0 1 0 1 1

$$0.3456 \times 2 = 0.6912$$

$$0.6912 \times 2 = 1.3824$$

$$0.3824 \times 2 = 0.7648$$

$$0.7648 \times 2 = 1.5296$$

$$0.5296 \times 2 = 1.0592$$

2	63	
2	31	- 1
2	15	- 1
2	7	- 1
2	3	- 1
2	1	- 1

$$0.3456 - 0.25 = 0.0956$$

$$0.0956 - 0.0625 = 0.0331$$

$$0.0331 - 0.03125 = 0.00185$$

(b) 4 7 . 9 2 3 2

32 16 8 4 2 1 0.5

1 0 1 1 1 1 . 1 1 1 0 1 1

2	47	
2	23	- 1
2	11	- 1
2	5	- 1
2	2	- 1
	1	- 0

$$0.9232 - 0.5 = 0.4232$$

$$0.4232 - 0.25 - 0.125 = 0.0482$$

$$0.0482 - 0.03125 = 0.01695$$

$$0.01695 - 0.015625 = 0.001325$$

Q3. -121

(a) 128 64 32 16 8 4 2 1
0 1 1 1 1 0 0 1 (121)

1 1 1 1 1 0 0 1 (-121)

(b) 1 0 0 0 0 1 1 0

(c) 1 0 0 0 0 1 1 1

$$0.9232 \times 2 = 1.8464$$

$$0.8464 \times 2 = 1.6928$$

$$0.6928 \times 2 = 1.3856$$

$$0.3856 \times 2 = 0.7712$$

$$0.7712 \times 2 = 1.5424$$

Q4. ^(128 64 32 16 8 4 2 1)
1 0 0 1 1 0 0 1

(a) $16 + 8 + 1 \Rightarrow -25$

(b) 0 1 1 0 0 1 1 0, $64 + 32 + 4 + 2 \Rightarrow 102$

(c) 0 1 1 0 0 1 1 1, $64 + 32 + 4 + 2 + 1 \Rightarrow 103$

Q5.

(a) 11011

Q4. (a) 10011001

$16 + 8 + 1 \Rightarrow -25$

(b) 10011001

$\Rightarrow -102$

(c) 10011001

$= -128 + 1 + 8 + 16 \Rightarrow -103$

Q5. (a) binary gray code
11011 \rightarrow 10110

(b) 1001010 \rightarrow 1101111

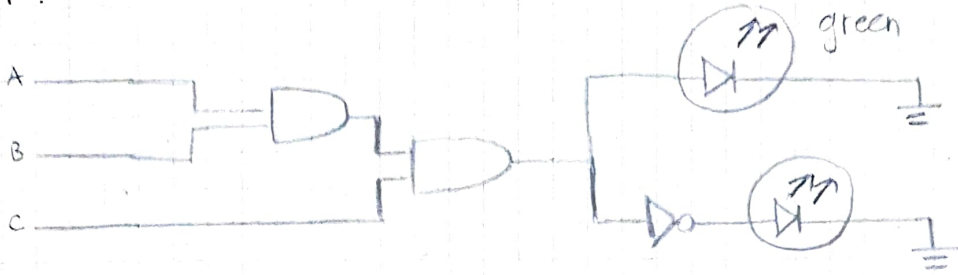
(c) 111011101110 \rightarrow 000110011001

Q6. (a) 1010 Gray code
 $\Rightarrow 1100$ (Ans)

(b) 00010 Gray code
 $\Rightarrow 00011$ (Ans)

(c) 11000010001 Gray code
 $\Rightarrow 10000011110$ (Ans)

Q7.



Q8.



Q9. ^{sign bit} 11010100 → 2's complement
 X 01011100 00101100
 01011100

(a)

$$\begin{array}{r}
 00101100 \\
 \underline{01011100} \\
 00000000 \\
 00000000X \\
 \hline
 00000000 \\
 + 01011100XX \\
 \hline
 0101110000 \\
 01011100XX \\
 \hline
 010001010000 \\
 0000000000XX \\
 \hline
 00101010100000 \\
 00101110000000 \\
 \hline
 110111010000
 \end{array}$$

Ans = ~~110111010000~~
 1000000110000

↖ 2's complement

(b) unsigned

$$\begin{aligned}
 &11010100 \quad X \quad 01011100 \\
 &(128+64+16+4) \times (64+16+8+4) \\
 &212 \times 92 \Rightarrow 19504 \\
 &\Rightarrow 100110000110000
 \end{aligned}$$

2	19504	-	0
2	9752	-	0
2	4876	-	0
2	1919	-	0
2	609	-	1
2	304	-	1
2	152	-	0
2	76	-	0
2	38	-	0
2	19	-	0
2	9	-	0
2	5	-	0
2	2	-	0