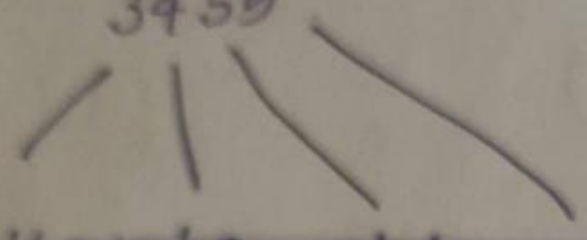
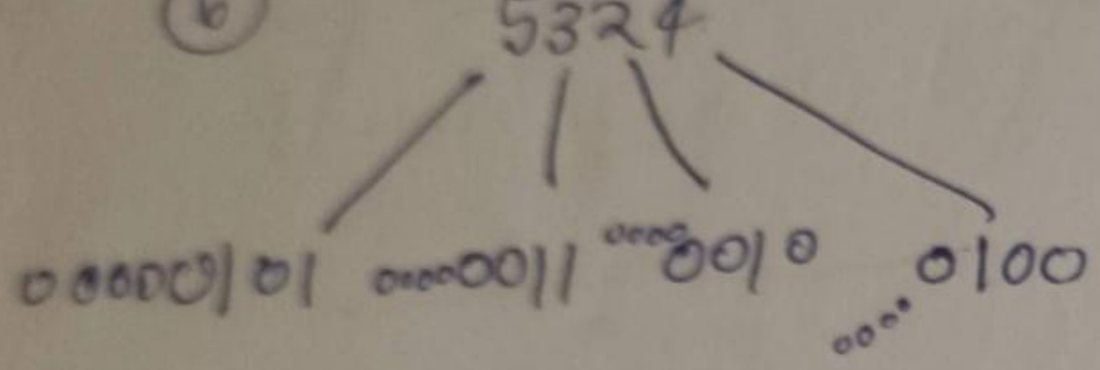
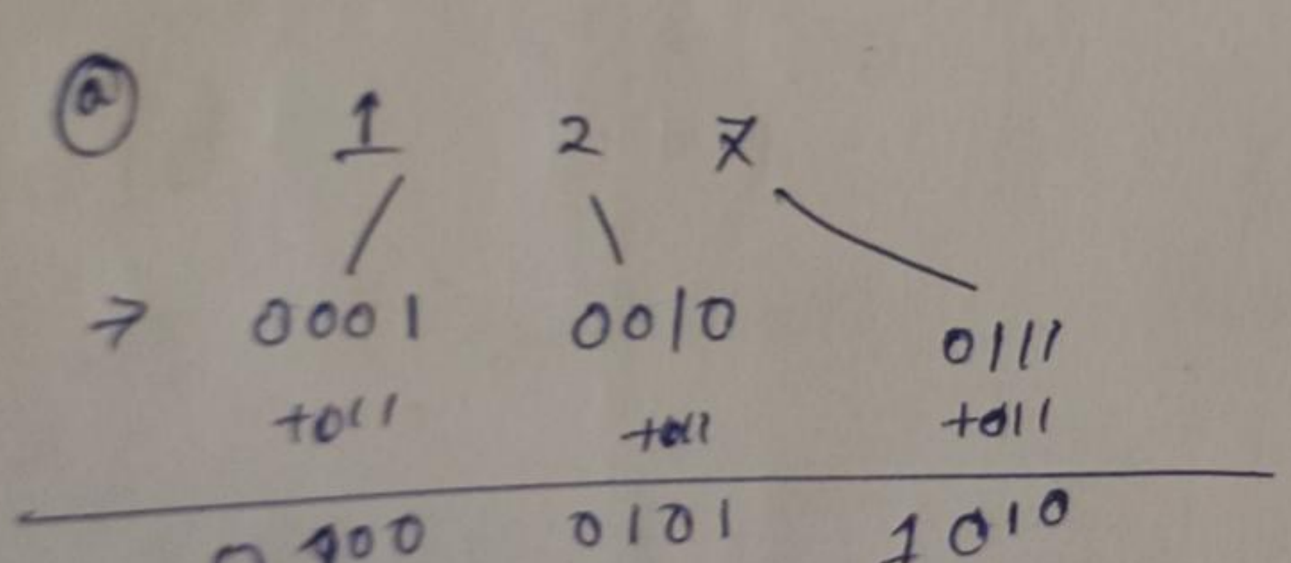
5/ (a) 3459 decimal to BCD



(b) 5324



6/ (a) 127



∴ (0100 0101 1010)$_C$

(b) 46

0100	0110
+11	+11
0111	1001

4/ (Gray to binary)

(a) 1 1 0 0

↓ +1 +1 +0 +0

1 0 0 0

= 8

(b) 0 1 1 1

↓ + + + +

0 1 0 1

⇒ 5

(c) 1 1 0 1

↓ + + +

1 0 0 1

⇒ 9

(5) binary to gray

(a) 1 0 1 0

↓ + + +

1 1 1 1

(b) 1 0 0 1

↓ + + +

1 0 1

1 1 0 1

(c) 1 1 1 1

↓ + + +

1 1 1

1 0 0 0

(a) G X

G → 0110

X → 0111

(b) 4 5 6

4 → 0100

5 → 0101

6 → 0110

(c) 1 9 3 5

1 → 0001

9 → 1001

3 → 0011

5 → 0101

9/ (a)

(5)

(a) 10001

5 bit ∴ check bits → 4 (1, 2, 4, 8)

9	8	7	6	5	4	3	2	1
1	↓	0	0	0	↓	1	↓	↓
	1				0		1	0

9 → 1001

3 → 0011

1010

∴ (11 0000 1 10)$_2$

9) (b)

1 1 1 00 1 1 1 000

11 bit check bit 5 (1, 2, 4, 8, 16)

16 15 14 13 12 11 10 9 8 7 6 5

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
x	1	1	1	0	0	1	1	x	1	0	0	x	0	x	x

→ 15 → 1111
14 → 1101
13 → 1101
10 → 1010
9 → 1001
7 → 0111

1011

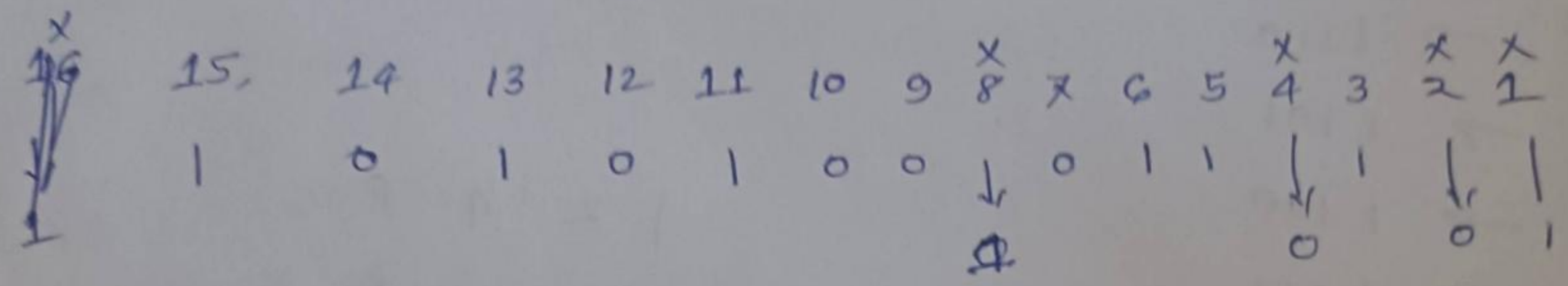
(11100 1111000 0 11)$_2$

∴ (~~11100 1101001 0 11~~)$_2$

9/ ⓒ

1010 1000 111

11 bit check bit 5 (1, 2, 4, 8, 16)



15 → 1111
13 → 1101
11 → 1011
6 → 0110
5 → 0101
3 → 0011

1001

19 (1010 100 10110101)

(10)

0 1111 0 1001 0 1101

14 13 12 11 9 6 4 3 1

14 → 1110

→ 13 → 1101

12 → 1100

11 → 1011

9 → 1001

6 → 0110

4 → 0100

3 → 0011

1 → 0001

1	2	4	8
1	1	0	1

1101 → 13 → $2^3 + 2^2 + 2^0$ → 8 + 4 + 1 → 13

Error is at position 13

(11) 0 1000001

0 1000001

$\Rightarrow 2^6 + 2^0$

$\Rightarrow 64 + 1$

$\Rightarrow 65 = A$

(12)

(a) 01101101

$2^6+2^5+2^3+2^2+2^0$

$64+32+8+4+1$

→ 109

(b) 01111111

$2^6+2^5+2^4+2^3+2^2+2^1+2^0$

→ $64+32+8+16+4+2+1$

→ 127

(c) 10000000

→ 2^7

→ 128

(13)

(14) (a) $13 - 8$

$\rightarrow$ 13 $\Rightarrow$ 0000 1101

8 $\rightarrow$ 0000 1000

1111 0111 $\rightarrow$ 15'

+1 25

11111000

$\therefore$

$$\begin{array}{r} 13 \\ +8 \\ \hline 5 \end{array}$$

0000 1101

1111 1000

$\overline{}$

$\boxed{1}$ 0000 0101

Carry bit

(101) = 5

(b) 8 $\rightarrow$ 00001000

$-13 \rightarrow$ 00001101

11110010

+1

$\overline{}$

11 11 0011

$\therefore$

$$\begin{array}{rl} 8 & \rightarrow \\ -13 & \rightarrow \\ \hline -5 & \end{array}$$

00001000

11110011

$\overline{}$

11111011

$-1\times2^{7} + 1\times2^{6} + 1\times2^{5} + 1\times2^{4} + 1\times2^{3} + 1\times2^{1} + 1\times2^{0}$

$\Rightarrow -128 + 64 + 32 + 8 + 2 + 1 + 16$

$-128 + 123 = -5$

(15) (a) 1 0 1 0 1 0 1 1 1 0 1 0 1 1 0 1

hex

→ 1010 1011 1010 1101

10 11 10 13

→ $(10111013)_{16}$

→ A B A D

Octal

101 010 110 101 101

$(5\ 2\ 6\ 5\ 5)_8$

(b) 1011 1110 1010 1011

$(11\ 14\ 11\ 11)_{16}$

⇒ $(B\ E\ B\ B)_{16}$

001 011 111 010 101 011

$(1\ 2\ 3\ 2\ 5\ 3)_8$

16)

(a) 42.625

42 → 4212 →