Q_1) convert to decimal

a) $(735)_8 = (477)_{10}$

$(7 \times 8^2) + (3 \times 8^1) + (5 \times 8^0)$

$= 448 + 24 + 5$

$= 477$

b) $(525)_6 = 337_{10}$

$(5 \times 6^2) + (2 \times 6^1) + (5 \times 6^0)$

$= 180 + 12 + 5$

$= 197_{10}$

Q_2) convert to hexa and decimal, explain why decimal answer b is 4 times a

a) 1.10010

$2^0 \; 2^{-1} \; 2^{-4}$

$1 + \frac{1}{2} + \frac{1}{16}$

$= 1.5625_{10}$

b) 110.010

$2^2 \; 2^1 \; 2^{-2}$

$4 + 2 + \frac{1}{4}$

$= 6.25_{10} \rightarrow$ Hexa $= 6.4_{16}$

* a is 4 times b because in b the decimal is moved 2 digits to the right and since each digit in binary represent only 2 values so $2 \times 2 = 4$.

2^2 ← binary base 2

= modified value is 4 times old value

numbers of digits decimal moved

- Hexa

0001.

1.9_{16}

Q3) 1's complements and 2's complement

a) 10000000

01111111 ← 1's complement

\+ 1

10000000 ← 2's complement

b) 0000000

1111111

\+ 1

0000000

c) 11011010

00100101

\+ 1

00100110

d) 01110110

10001001

\+ 1

10001010

Q4)

a) 10011 - 10001

```
  10011
- 01111
-------
  00010  = (2)10
```

b) 100010 - 100011

```
  100010
- 011101
--------
  111111
```

$(-000001)_2 = -1_{10}$

c) 1001 - 101000

```
  001001
- 011000
--------
  100001
```

$(-011111)_2 = 31_{10}$

d) 110000 - 10101

```
  110000
- 001011
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  011011  = (27)10
```

Q5) 5.137 in BCD

8 4 2 1

0101 . 0001 0011 0110

excess 3 = 1000 . 0100 0110 1010