1.

| Base 10(decimal numbers) | binary(32,16,8,4,2,1) | octal(group binary into groups of 3 and then(8,4,2,1) | hexadecimal(group binary into 4 and then (16,8,4,2,1) |
|---|---|---|---|
| 35 → 32+2+1 | 100011 | 100 011 $\rightarrow 43)_8$ | 0010 0011 → $23)_{16}$ |
| 36 | 100100 | $44)_8$ | $24)_{16}$ |
| 37 | 100101 | $45)_8$ | $25)_{16}$ |
| 38 | 100110 | $46)_8$ | $26)_{16}$ |
| 39 | 101000 | $47)_8$ | $27)_{16}$ |
| 40 | 101010 | $50)_8$ | $28)_{16}$ |
| 41 | 101011 | $51)_8$ | $29)_{16}$ |
| 42 | 101010 | $52)_8$ | $2A)_{16}$ |
| 43 | 101011 | $53)_8$ | $2B)_{16}$ |

2. Binary to Decimal

a) 01101 → 1 + 4 + 8 → 13

b) 11010 → 2 + 8 + 16 → 26

Explain why the answer in b is 2 times a): b is 2 times a because when you shift the binary number down 2^n

Problem 3:

a)$-\ 32)_{10}$ to decimal using sign and magnitude

1 10 0000

b)$-\ 32)_{10}$ to decimal using 1s complement

1 01 1111

c)$-\ 32)_{10}$ to decimal using 2s complement

1 00 000 (because -0 doesn't have a binary representation in 2's complement, we can assign -32 to this representation

d) Compare and discuss the results of a) . What is the minimum number of bits used to represent the number and why?

7 bits because we need 6 for the magnitude and 1 for the sign

Problem 4

a) Convert the binary sign-and-magnitude number 1110 to 1's complement representation?

1 001

b) Convert the result in a) to 2’s complement representation

1 010

c) Convert the result in b) to a decimal number

1 110 → - 6  1s complement

Problem 5

d) Convert the binary 2's complement number 100111 to 1's complement representation

1 00110

e) b) Convert the result in (a) to sign - and -magnitude representation

1 11001