Part 1 - binary and hexadecimal

1. Convert the following decimal numbers to binary:
(a) 10 = 1010
(b) 25 = 11001
(c) 42 = 101010
(d) 66 = 1000010
(e) 105 = 1101001
(f) 201 = 11001001

2. Convert the following binary numbers to decimal:
(a) 1110 = 2^3+ 2^2+ 2^1= 8+4+2=14
(b) 1011 = 2^3+2^1+2^0 = 8+2+1 = 11
(c) 10011= 2^4 + 2^1+2^0 = 16+2+1 = 19
(d) 10101010 = 170
(e) 11111000 = 2^7+2^6+2^5+2^4+2^3= 248
(f) 1111 = 15
(g) 111111 = 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 63
(h) 1111111 = 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 127
(i) 11111111 = 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 255
(j) f,g,h,and i all have 1's in all the bits. Value in decimal = 2^n – 1 where n=number of bits (e.g. 1111=2^4 – 1 = 15 n=4)

3. Convert the following decimal numbers to hexadecimal:
(a) 16 = 10_{16}
(b) 64 = 40_{16}
(c) 101 = 65_{16}
(d) 106 = $6A_{16}$
(e) 255 = FF_{16}
(f) 256 = 100_{16}

4. Convert the following hexadecimal numbers to decimal:
(a) $16_{16} = 1(16)^1 + 6(16)^0 = 16 + 6 = 22$
(b) $64_{16} = 6(16)^1 + 4(16)^0 = 96 + 4 = 100$
(c) $ABC_{16} = 10(16)^2 + 11(16)^1 + 12(16)^0 = 2560+176 + 12 = 2748$
(d) $3E4_{16} = 3(16)^2 + 14(16)^1 + 4(16)^0 = 768+ 224+ 4 = 996$
(e) $4D6_{16} = 4(16)^2 + 13(16)^1 + 6(16)^0 = 1238$
(f) $FF1_{16} = 15(16)^2 + 15(16)^1 + 1(16)^0 = 4081$

5. Convert the following binary numbers to hexadecimal:
(a) 1010 = A_{16}
(b) 1101 = D_{16}
(c) 10011001 = 99_{16}
(d) 11000111 = $C7_{16}$
(e) 11110 = $1E_{16}$
(f) 1111 = F_{16}
(g) 1010101 = 55_{16}
(h) 1101100111 = 367_{16}
(h) 10101010101000 = $2AA8_{16}$

5. Compute the results of the following addition operations. Write the result in the same base as the original numbers.
(a) 1001 + 0101 (binary) = 1110_2
(b) 10000000 + 11000000 (binary) = 101000000_2
(c) 1F0 + E1A (hexadecimal) = $100A_{16}$
(d) A2 + 1F (hexadecimal) = $C1_{16}$

Take note that Questions 5 is for interest only. It will not be on any test.