Computer Systems: Revision Questions 1

1. Convert the following binary numbers into denary.
    a. 1101100100010101
    b. 0011101101011011
    c. 0000110110010011
    d. 1011000110
    e. 0100111011

2. Convert the following denary numbers into 16 bit binary numbers.
    a. 41,357
    b. 35,145
    c. 1023
    d. 29,999
    e. 5763

3. State the range of positive integers that can be represented using the following number of bits.
    a. 7 bits
    b. 8 bits
    c. 11 bits
    d. 13 bits
    e. 15 bits

4. Convert the following negative decimal numbers into binary using 8 bits.
    a. -12
    b. -65
    c. -47
    d. -113
    e. -120

5. Convert the following negative 8 bit binary numbers into decimal.
    a. 10011010
    b. 10001101
    c. 11111000
    d. 10101011
    e. 10010110

6. State the range of integers that can be represented using the following number of two's complement bits.
    a. 3 bits
    b. 5 bits
    c. 7 bits
    d. 4 bits
    e. 8 bits

7. Convert the following to 16 bit mantissa and 8 bit exponent floating point numbers
    a. 101100.111
    b. -11.00110
    c. 0.0110011
    d. -0.00110011
    e. 101111.010

8. A programming language uses 32 bits to represent a real number such as 0.000000016. 8 bits are used for the exponent and 24 bits are used for the mantissa. State the effect on range and precision if this allocation was changed to 16 bits each for both exponent and mantissa.

9. A programming language uses 32 bits to represent a real number such as 0.000000234. 16 bits are used for the exponent and 16 bits are used for the mantissa. State the effect on range and precision if this allocation was changed to 12 bits for the exponent and 20 bits for the mantissa.

10. A programming language uses 32 bits to represent a real number such as 0.000000234. 24 bits are used for the exponent and 8 bits are used for the mantissa. State the effect on range and precision if this allocation was changed to 26 bits for the exponent and 6 bits for the mantissa.