Exercises about representation of information

Add a few explanations to demonstrate how to perform each conversion. For example, from decimal to binary we use powers and then explain the corresponding operations.

1. Convert from decimal to binary:
   a. 234=11101010
   b. 555=1. 00101011
   c. 12321=110000. 00100001
   d. 152=10011000
   e. 32768=10000000. 00000000

2. Convert from binary to decimal:
   a. 100000000=256
   b. 1011110100=756
   c. 10011101=157
   d. 11111111111=2047

3. Convert from hexadecimal to binary:
   a. 45A0=100.0101.1010.0000
   b. CF=1100.1111
   c. AAB2=1010.1010.1011.0010
   d. 3020=11.0000.0010.0000

4. Convert from binary to hexadecimal:
   a. 1.1000.1000 = 188
   b. 1.0001.0110=116

5. Complete the following conversions related to octal numeral system:
   a. Convert the numbers from exercise 4 to octal.
      110.001.000=610
      100.010.110=426
   b. Convert the octal 3020 to binary.
      3020=11.000.010.000

6. Fill in the gaps, using all the conversions you need. You have to write the steps to transform each number.

BINARY	DECIMAL	HEXADECIMAL	OCTAL
100001	33	21	41
11111111	255	FF	377
11111111	255	FF	377
10 0001	33	21	41

7. How many bits do you need to represent the following numbers in binary?
   a. hexadecimal: 4B, 4AA, FF4FA, 345F
      4B=1001011=7 Bits/ 1 Byte
      4AA=100.10101010=11 Bits/ 2 Bytes
      FF4FA=1111.11110100.11111010=20 Bits/ 3 Bytes
      345F=110100.01011111=14 Bits/ 2 Bytes
   b. decimal: 100, 256, 255, 32, 31, 3, 4350, 1024, 45, 2^{30} , 63
      100=1100100=7 Bits/ 1Byte
      256=1.00000000=9 Bits/ 2 Bytes
      255=11111111= 8 Bits/ 1 Byte
      32=100000=6 Bits/ 1 Byte
      31=11111=5 Bits/ 1 Byte
      3=11= 2 Bits/ 1 Byte
      4350= 10000.11111110= 13 Bits/ 2 Bytes
      1024=100.00000000= 11 Bits/ 2 Bytes
      45=101101=6 Bits/ 1 Byte
      2^{30} =1.073.741.824=1000000.00000000.00000000.00000000=31 Bits/ 4 Bytes
      63=111111=6 Bits/ 1 Byte
8. Solve the following parts using ASCII extended (8 bits).
   a. Write a random text, which contains letters, numbers and other alphanumeric characters.
   b. Encode to hexadecimal, according ASCII table.
   c. Convert to binary.

   a) 65 114 101.121 111 117. 111 75 97 121. 63
   b) 82E4 CAF2 DEEA DE96
   c) 01000001. 01110010. 01100101. 01111001. 01101111. 01110101. 01101111. 01001011. 01100001. 01111001. 00111111