Digital Electronics

Tutorial-I

1. Convert each of the following binary numbers to octal, decimal, and hexadecimal formats.

   i. $(111011101.001)_2$ Ans. $(735.1)_8 = (1DD.2)_{16} = (477.125)_{10}$

   ii. $(10101010111)_2$ Ans. $(2527)_8 = (11367)_{10} = (557)_{16}$

   iii. $(111100000)_2$ Ans. $(740)_8 = (480)_{10} = (1E0)_{16}$

2. Convert each of the following octal numbers to binary, decimal, and hexadecimal formats.

   i. $(3754)_8$ Ans. $(11111101100)_2 = (7EC)_{16} = (2028)_{10}$

   ii. $(7777)_8$ Ans. $(111111111111)_2 = (FFF)_{16} = (4095)_{10}$

   iii. $(247.4)_8$ Ans. $(10100111.100)_2 = (A7.8)_{16} = (167.5)_{10}$

3. Convert each of the following decimal numbers to binary, octal, and hexadecimal formats.

   i. $(3479.25)_{10}$ Ans. $(110110010111.01)_2 = (D97.4)_{16} = (6627.2)_8$

   ii. $(642)_{10}$ Ans. $(1010000010)_2 = (282)_{16} = (1202)_8$

   iii. $(555)_{10}$ Ans. $(1000101011)_2 = (22B)_{16} = (1053)_8$

4. Convert each of the following hexadecimal numbers to binary, octal, and decimal formats.

   i. $(4FB2)_{16}$ Ans. $(100111110110010)_2 = (47662)_8 = (20402)_{10}$

   ii. $(88BAE)_{16}$ Ans. $(10001000101110101110)_2 = (2105656)_8 = (560046)_{10}$

   iii. $(DC4.7)_{16}$ Ans. $(110111000100.0111)_2 = (6704.34)_8 = (3524.4375)_{10}$

5. Perform each of the addition operations indicated below.

   i. $(1001011)_2 + (11101)_2$ Ans. $(1101000)_2$

   ii. $(4556)_8 + (1245)_8$ Ans. $(6023)_8$

   iii. $(BCD)_{16} + (A34)_{16}$ Ans. $(1601)_{16}$

6. Form the two's complement of each of the following binary numbers.

   i. $(111011101110)_2$ Ans. 000100010010

   ii. $(111111111000100)_2$ Ans. 00000000111100

   iii. $(100000000)_2$ Ans. 100000000

   iv. $(1010101010111)_2$ Ans. 0101010101001

7. Perform each of the subtraction using two's complement.

   i. $(100101)_2 - (11011)_2$ Ans. $(001010)_2$

   ii. $(1101011)_2 - (111010)_2$ Ans. $(0110001)_2$

   iii. $(1110111)_2 - (10110111)_2$ Ans. $(1000000)_2$