Digital Systems

Arithmetics and binary codes

1. Perform the following operations:
   (a) $1011_{(2)} + 101_{(2)}$
   (b) $101011_{(2)} + 1110_{(2)}$
   (c) $940_{(16)} + A3_{(16)}$
   (d) $1001_{(2)} * 0101_{(2)}$
2. Represent the following numbers in 2's complement, with 8 bits:
   (a) $86_{(10)}$
   (b) $-86_{(10)}$
   (c) $11010_{(2)}$
   (d) $31_{(10)} - 8_{(10)}$ (perform the calculations using 2's complement representation)
   (e) $-101_{(10)} - 99_{(10)}$ (perform the calculations using 2's complement representation)
3. What is the number (base 10) that corresponds to:
   (a) $00001011_{(C2)}$
   (b) $10111110_{(C2)}$
   (c) $11100010_{(C2)}$
4. What is the Natural Binary Code (NBC) of minimum length of numbers 31 and 1467.
5. Convert the following number to BCD
   (a) $6023_{(10)}$
   (b) $12.5_{(10)}$
   (c) $9.81_{(10)}$
   (d) $1101001_{(2)}$
6. Convert the following numbersr to decimal (base 10) and binary:
   (a) $1101000100100 11_{(BCD)}$
   (b) $10001010101_{(BCD)}$
7. Build the 5 bit Gray code.