COE 202, Term 162

Digital Logic Design

HW# 1   Solution

Q.1. Convert the following numbers from the given base to the bases indicated:

  (i) Decimal 225.225 to binary, octal, and hexadecimal.

  (ii) Binary 11010111.110 to decimal, octal, and hexadecimal.

  (iii) Octal 623.77 to decimal and binary.

  (iv) Hexadecimal 2AC5.D to decimal, octal and binary.

Q.2. Perform the following arithmetic operations using the designated bases without converting to decimal. Verify your result by converting the numbers to decimal and then performing the operation in decimal:

  (i) $(10E)_{16} + (13F)_{16}$

  (ii) $(1E)_{16} * (10)_{16}$

  (iii) $(1101)_2 * (1000)_2$

Q.3. If you type the phrase COE205 on your keyboard, what is the binary sequence sent to the computer using 8-bit ASCII with the 8th bit being an even parity bit.

Q.4. Translate the following secret message, which has been encoded in ASCII as: 41 74 74 61 63 6B 20 61 74 20 44 61 77 6E.

Q.5. Suppose that a byte contains the ASCII code of a decimal digit; that is `0` to `9`. What hex number should be subtracted from the byte to convert it to the numerical form of the characters?

Q1   (i)   225.225

Binary   1110 0001 . 0011 1001 1001

octal   341 . 163 --

Hexadecimal   E1 . 399 --

(ii)   Binary   11010111 . 110

Decimal   215 . 75

Octal   327 . 6

Hexadecimal   D7 . C

(iii)   Octal   623 . 77

Decimal   403 . 98437 --

Binary   110010011 . 111 111

(iv)   Hexadecimal   2AC5 . D

Decimal   10 949 . 8125

Binary   0010 1010 1100 0101 . 1101

Octal   2 5 3 0 5 . 6 4

Q2

(i)

```
        1
      1 0 E          2 7 0
    + 1 3 F        + 3 1 9
    ─────────      ─────────
      2 4 0          5 8 9
```

(ii)

```
        1 E              3 0
      *   1 0          *   1 6
      ───────          ───────
        0   0            1 8 0
      1 E                3 0
      ───────          ───────
      1 E 0              4 8 0
```

(iii)

```
        1 1 0 1              2
      *   1 0 0 0            1 3
      ───────────         x    8
        0 0 0 0           ───────
      0 0 0 0               1 0 4
    0 0 0 0
  1 1 0 1
  ─────────────
  1 1 0 1 0 0 0
```

Q3.

C   O   E   2

1100 0011   1100 1111   1100 0101.   1011 0010

Ø   5

0011 0000   0011 0101

Q4.

The message is : Attack at Dawn

Q5.

To convert the ASCII code of a decimal digit to a number we need to subtract from it 30H, i.e, the ASCII code of character '0'.