Basics of Digital Eletronics (CE145)

Tutorial - 1  (CE1/CE2).

Q1  Convert the decimal number (250.5) to base 3, base 4, base 7, base 8 & base 16

Q2  Convert $(225.225)_{10}$ to binary, octal and hexadecimal

Q3  Convert $(11010111.110)_2$ to decimal, octal and hexadecimal.

Q4  Convert $(623.77)_8$ to decimal, binary and hexadecimal.

Q5  Convert (2AC5.D) to decimal, octal and binary.

Q6  Convert the following numbers to decimals

① $(12121)_3$     ② $(0.342)_6$     ③ $(50)_7$

④ $(8.3)_9$     ⑤ $(1032.2)_4$     ⑥ $(198)_{12}$

① $(250.5)_{10}$ 　　　　　　　　$(100021 . 111 \ldots)_3$

　　　　　　　　　　　　　　　　$0.5 \times 3 = 1.5$

| 3 | 250 | |
|---|-----|---|
| 3 | 83 | 1 |
| 3 | 27 | 2 |
| 3 | 9 | 0 |
| 3 | 3 | 0 |
|   | 1 | 0 |
|   |   | 1 |

| 4 | 250 | |　　　　　$(3322.2)_4$
|---|-----|---|
| 4 | 62 | 2 |　　　$0.5 \times 4 = 2$
| 4 | 15 | 2 |
|   | 3 | 3 |
|   |   | 3 |

| 8 | 250 | |　　　　$(372.4)_8$
|---|-----|---|
| 8 | 31 | 2 |　　　$0.5 \times 8 = 4$
|   | 3 | 7 |
|   |   | 3 |

| 16 | 250 | | |
|----|-----|----|---|
|    | 15 | 10 | A |　　$(FA.8)_{16}$
|    |    | 15 | F |　　$0.5 \times 16 = 8$

② $(225 . 275)_{10}$            $(1110\ 0001 .\ 0\ 0111001 1 . . . )_2$

| 2 | 225 | |
|---|-----|---|
| 2 | 112 | 1 |
| 2 | 56 | 0 |
| 2 | 28 | 0 |
| 2 | 14 | 0 |
| 2 | 7 | 0 |
| 2 | 3 | 1 |
| | 1 | 1 |
| | | 1 |

③   $(11010111 . 110)_2$

$$= 2^7 + 2^6 + 0 + 2^4 + 0 + 2^2 + 2^1 + 0 + \frac{1}{2} + \frac{1}{2^2}$$

$$= (215 . 75)_{10}$$

$$= (327 . 6)_8$$

$$= (D7 . C)_{16}$$

4) $(623.77)_8 = 6 \times 8^2 + 2 \times 8 + 3 + \dfrac{7}{8} + \dfrac{7}{8^2}$

$= (403.984375)_{10}$

$= (110 \cdot 010 \ 011 . 111 \ 111)_2$

$= (193.FC)_{16}$

⑤ $(2AC5.D)_{16}$

$= 2 \times 16^3 + 10 \times 16^2 + 12 \times 16 + 5 + \dfrac{13}{16}$

$= (10949.5)_{10}$

$= (0010 \ 1010 \ 1100 \ 0101 . 1101)_2$

$= (25305.4)_8$

⑥ i) $(12121)_3$

$= 3^4 + 2 \times 3^3 + 1 \times 3^2 + 2 \times 3 + 1$

$= (151)_{10}$

ii) $(0.342)_6$

$= \dfrac{3}{6} + \dfrac{4}{6^2} + \dfrac{2}{6^3}$

$= (0.62037037)_{10}$

III) $(50)_7 = 5 \times 7 = (35)_{10}$

IV) $(8.3)_9 = 8 \times 9^0 + \dfrac{3}{9}$

$= (8.33\ldots)_{10}$

V) $(1032.2)_4 = 4^3 + 3 \times 4 + 2 + \dfrac{2}{4}$

$= (78.5)_{10}$

VI) $(198)_{12} = 12^2 + 9 \times 12 + 8 = (260)_{10}$

23-2-23