Exercises:

1- Convert (37)10 and (59)10 to binary, octal, and hexadecimal.

37 to (2)

|  |  |  |
| --- | --- | --- |
| 37/2 | 18 | 1 |
| 18/2 | 9 | 0 |
| 9/2 | 4 | 1 |
| 4/2 | 2 | 0 |
| 2/2 | 1 | 0 |
| 1/2 | 0 | 1 |
| 100101 | | |

37 to (8)🡺 100 101==45

37 to (16)🡺10 0101 ==25

59 to (2)

|  |  |  |
| --- | --- | --- |
| 59/2 | 29 | 1 |
| 29/2 | 14 | 1 |
| 14/2 | 7 | 0 |
| 7/2 | 3 | 1 |
| 3/2 | 1 | 1 |
| 1/2 | 0 | 1 |
| 111011 | | |

59 to (8)🡺 111 011==73

59 to (16)🡺 11 1011==3B

2- Convert the following binary numbers to decimal.

a) (100110110)2

28+27+26+25+24+23+22+21+20=256+32+16+4+2=310

b) (1001100.0101)2

26+25+24+23+22+21+20+2-1+2-2+2-3+2-4=64+8+4+0.25+0.0625=76.3125

3- Convert the following decimal numbers to the stated number system.

a) (83.85)10= (?)8 1 010 011. 110 110 t0(8)🡺123.66

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 83/2 | 41 | 1 | 0.85\*2 | 1.7 | 1 |
| 41/2 | 20 | 1 | 0.7\*2 | 1.4 | 1 |
| 20/2 | 10 | 0 | 0.4\*2 | 0.8 | 0 |
| 10/2 | 5 | 0 | 0.8\*2 | 1.6 | 1 |
| 5/2 | 2 | 1 | 0.6\*2 | 1.2 | 1 |
| 2/2 | 1 | 0 | 0.2\*2 | 0.4 | 0 |
| 1/2 | 0 | 1 | 0.4\*2 | 0.8 | 0 |
| 1010011 | | | 0.11011 | | |
| 1010011.11011 | | | | | |

b) (71.82)10= (?)16100 0111.1101 to (16)🡺47.D

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 71/2 | 35 | 1 | 0.82\*2 | 1.64 | 1 |
| 35/2 | 17 | 1 | 0.64\*2 | 1.28 | 1 |
| 17/2 | 8 | 1 | 0.28\*2 | 0.56 | 0 |
| 8/2 | 4 | 0 | 0.56\*2 | 1.12 | 1 |
| 4/2 | 2 | 0 | 0.12\*2 | 0.24 | 0 |
| 2/2 | 1 | 0 | 0.24 | 0.48 | 0 |
| 1/2 | 0 | 1 | 0.48\*2 | 0.96 | 0 |
| 1000111 | | | 1101000 | | |
| 1000111.1101000 | | | | | |

c) (25.25)10= (?)2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 25/2 | 12 | 1 | 0.25\*2 | 0.5 | 0 |
| 12/2 | 6 | 0 | 0.5\*2 | 1.0 | 1 |
| 6/2 | 3 | 0 |  |  |  |
| 3/2 | 1 | 1 |  |  |  |
| 1/2 | 0 | 1 |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| 11001 | | | 01 | | |
| 11001.01 | | | | | |

4- Convert the following numbers to the stated number system.

a) (BF2.D) 16= (?)8101 111 110 010. 110 100 TO(8)🡺5762.64

|  |  |
| --- | --- |
| B | 1011 |
| F | 1111 |
| 2 | 0010 |
| D | 1101 |
| 101111110010.1101 | |

b) (312.20)4= (?)8 110 110.1000 TO(8)🡺66.4

|  |  |
| --- | --- |
| 3 | 11 |
| 1 | 01 |
| 2 | 10 |
| 2 | 10 |
| 0 | 00 |
| 110110.1000 | |

c) (F13) 16= (?)8 111 100 010 011 TO(8)🡺7423

|  |  |
| --- | --- |
| F | 1111 |
| 1 | 0001 |
| 3 | 0011 |
| 111100010011 | |

d) (8AA) 16= (?)8 100 010 101 010 TO(8)🡺4252

|  |  |
| --- | --- |
| 8 | 1000 |
| A | 1010 |
| A | 1010 |
| 100010101010 | |

5- Convert the following numbers from binary to hexadecimal and octal.

1. 10 011 011

T0(8)🡺233

TO(16)🡺9B

b) 01 001 001

TO(8)🡺111

TO(16)🡺49

6- Perform the following arithmetic operations.

1. 10101011 + 11001001=0001 0111 0100

b) 110110 \* 1010=0010 0001 1100