2.2: 6, 8, 10 2.4: 15
2.3: 13 2.5: 19
2.6: 28, 29

Striker Herd
9/1/21
Phys 306

Homework #2 Phys 306

6). Binary to decimal

a). 1110 $2^3 2^2 2^1 2^0$ $8+4+2=14$

B). 1010 $2^3 2^2 2^1$ $8+0+2=10$

C). 11100 $2^4 2^3 2^2 2^1 2^0$ $16+8+4=28$

D). 10000 2^4 $=16$

E). 10101 $2^4 2^2 2^0$ $=16+4+1=21$

F). 11101 $2^4 2^3 2^2 2^0$ $=16+8+4+1=29$

G). 10111 $2^4 2^2 2^1 2^0$ $16+4+2+1=23$

H). 11111 $2^0+2^1+2^2+2^3+2^4=31$

8). highest decimal $= (2^n-1)$

a). $(2^2-1)=3$
b). $(2^3-1)=7$
C). $(2^4-1)=15$
D). $(2^5-1)=31$
E). $(2^6-1)=63$
F). $(2^7-1)=127$
G). $(2^8-1)=255$
H). $(2^9-1)=511$
I). $(2^{10}-1)=1023$
J). $(2^{11}-1)=2047$

10). Decimal to Binary

0→7		8→15	
0	000	8	1000
1	001	9	1001
2	010	10	1010
3	011	11	1011
4	100	12	1100
5	101	13	1101
6	110	14	1110
7	111	15	1111

16	1000	26	11010	36	100100	46	101110
17	10001	27	11011	37	100101	47	101111
18	10010	28	11100	38	100110	48	110000
19	10011	29	11101	39	100111	49	110001
20	10100	30	11110	40	101000	50	110010
21	10101	31	11111	41	101001	51	110011
22	10110	32	100000	42	101010	52	110100
23	10111	33	100001	43	101011	53	110101
24	11000	34	100010	44	101100	54	110110
25	11001	35	100011	45	101101	55	110111

60	111100	67	100011	74	1001010
61	111101	68	1000100	75	1001011
62	111110	69	100101		
63	111111	70	1000110		
64	1000000	71	1000111		
65	1000001	72	1001000		
66	1000010	73	1001001		

13). a) $\frac{15}{2} = 7$ 1 **1111 = 15**

7/2 = 3 1

3/2 1

1/2 1

B). 21/2 = 10 1 **10101 = 21**

10/2 = 5 0

5/2 = 2 1

2/2 = 1 0

1/2 = 0 1

13C). $28/2 = 14$ 0
$14/2 = 7$ 0
$7/2 = 3$ 1
$3/2 = 1$ 1
$1/2 = 0$ 1
11100 = 28

D). $34/2 = 17$ 0
$17/2 = 8$ 1
$8/2 = 4$ 0
$4/2 = 2$ 0
$2/2 = 1$ 0
$1/2 = 0$ 1
100010 = 34

E). $40/2 = 20$ 0
$20/2 = 10$ 0
$10/2 = 5$ 0
$5/2 = 2$ 1
$2/2 = 1$ 0
$1/2 = 0$ 1
101000 = 40

F). $59/2 = 29$ 1
$29/2 = 14$ 1
$14/2 = 7$ 0
$7/2 = 3$ 1
$3/2 = 1$ 1
$1/2 = 0$ 1
111011 = 59

G). $65/2 = 32$ 1
$32/2 = 16$ 0
$16/8 = 8$ 0
$8/2 = 4$ 0
$4/2 = 2$ 0
$2/2 = 1$ 0
$1/2 = 0$ 1
1000001 = 65

H). $73/2 = 36$ 1
$36/2 = 18$ 0
$18/2 = 9$ 0
$9/2 = 4$ 1
$4/2 = 2$ 0
$2/2 = 1$ 0
$1/2 = 0$ 1
1001001 = 73

15). a). $11 + 01$
$\begin{array}{r} 11 \\ +01 \\ \hline 100 \end{array}$ $\begin{array}{r} 3 \\ +1 \\ \hline 4 \end{array}$ **100 & 4**

b). $\begin{array}{r} 10 \\ +10 \\ \hline 100 \end{array}$ $\begin{array}{r} 2 \\ +2 \\ \hline 4 \end{array}$ **100 & 4**

c). $\begin{array}{r} 101 \\ +11 \\ \hline 1000 \end{array}$ $\begin{array}{r} 5 \\ +3 \\ \hline 8 \end{array}$ **1000 & 8**

D). $\begin{array}{r} 116 \\ +1101 \\ \hline 1101 \end{array}$ $\begin{array}{r} 7 \\ +6 \\ \hline 13 \end{array}$ **1101 & 13**

E). $\begin{array}{r} 1001 \\ +101 \\ \hline 1110 \end{array}$ $\begin{array}{r} 9 \\ +5 \\ \hline 14 \end{array}$ **1110 & 14**

F). $\begin{array}{r} 1101 \\ +1011 \\ \hline 11000 \end{array}$ $\begin{array}{r} 13 \\ +11 \\ \hline 24 \end{array}$ **11000 & 24**

1a). 1's compliment

00000000

Sum of all the weights is 0 given $\boxed{00000000}$

$11111111_{2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0}$

$-2^7+2^6+2^5+2^4+2^3+2^2+2^1+2^0$

$-128+64+32+16+8+4+2+1=-1$

$-1+1=\boxed{0}$

28). a). $2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$

$.10011001$ $\quad -2^7+2^6+2^5+2^4+2^3+2^2+2^1+2^0=\boxed{-103}$

b). $2^7\ 2^6\ 2^5\ 2^4\ 2^3\ 2^2\ 2^1\ 2^0$

$0\,1110100$

$2^6+2^5+2^4+2^2=64+32+16+4$

$=\boxed{+116}$

c). 10111111

$-2^7+2^5+2^4+2^3+2^2+2^1+2^0=-128+32+16+8+4+2+1$

$=\boxed{-65}$

24). a). $1\ 2\ 3\ 4\ 5\ 6\ 7\ 8\ 9\ 10\ 11\ 12\ 13\ 14\ 15\ 16$

$0111110000101011_2=1.1111000010101\times 2^{14}$

$14+127=141$

$=\boxed{10001101_2}$

full of table

b). $1\ 0\ 0\ 1\ 1\ 0\ 0\ 0\ 0\ 0\ 0\ 1\ 1\ 0\ 0\ 0$

$0011000000110000_2=1.1000000110000\times 2^{11}$

$11+127=138$

$=\boxed{10001010_2}$