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Inspiring Excellence

Assignment- 01

Subject title: Digital Logic Design
Subject code: CSE 260
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Section: 08
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Ans to the question no: 04

a) $(101110010001)_2 = (\quad)_{10}$

$= 1\times2^{11} + 0\times2^{10} + 1\times2^{9} + 1\times2^{8} + 1\times2^{7} + 0\times2^{6} + 0\times2^{5} + 1\times2^{4} + 0\times2^{3} +$
$0\times2^{2} + 0\times2^{1} + 1\times2^{0}$

$= 2048 + 0 + 512 + 256 + 128 + 0 + 0 + 16 + 0 + 0 + 0 + 1$

$= 2961$

$\therefore (101110010001)_2 = (2961)_{10}$

(Ans)

b) $(11011.101)_2 = (\quad)_{10}$

$= 1\times2^{4} + 1\times2^{3} + 0\times2^{2} + 1\times2^{1} + 1\times2^{0} + 1\times2^{-1} + 0\times2^{-2} + 1\times2^{-3}$

$= 16 + 8 + 2 + 1 + \frac{1}{2} + \frac{1}{8}$

$= 27 + 0.5 + 0.125$

$= 27.625$

$\therefore (11011.101)_2 = (27.625)_{10}$

(Ans).

Ans to the qustion on-2

$(4195)_{10} = (\ )_2$

2	4195	
2	2097	1
2	1048	1
2	524	0
2	262	0
2	131	0
2	65	1
2	32	1
2	16	0
2	8	0
2	4	0
2	2	0
	0	1

$\therefore (4195)_{10} = (1000001100011)_2$

(Ans)

Ans to the qustion on-3

a) $(45)_8 = (\quad)_{10}$

$= 4\times 8^1 + 5\times 8^0 = 37$

$\therefore (45)_8 = (37)_{10}$ (Ans)

b) $(2173)_8 = (\quad)_{10}$

$= 2\times 8^3 + 1\times 8^2 + 7\times 8^1 + 3\times 8^0 = (1147)_{10}$

$\therefore (2173)_8 = (1147)_{10}$

(Ans)

Ans to the question no-4

$(513)_{10} = (\quad)_{16}$

$$
\begin{array}{r|l}
16 & 513 \\
\hline
16 & 512 - 1 \\
\hline
16 & 32 - 0 \\
\hline
 & 2
\end{array}
$$

$\therefore (513)_{10} = (201)_{16}$

(Ans)

Ans to the question no-5

$(101101110)_2 = (\quad)_{16}$

$\underset{1}{\underline{0001}}\ \underset{6}{\underline{0110}}\ \underset{E}{\underline{1110}} = (16E)_{16}$

$\therefore (101101110)_2 = (16E)_{16}$

(Ans)

Ans to the qustion no - 6

a) $(29)_{12} = (\ \ )_7$

$2\times12^1 + 9\times12^0 = 24+9 = (33)_{10}$

$$\begin{array}{r|l}
7 & 33 \\ \hline
7 & 4 - 5 \\ \hline
 & 0 - 4
\end{array}$$

$\therefore (29)_{12} = (45)_7$ (Ans)

b) $(10110111)_5 = (\ \ )_4$

$= 1\times5^7 + 0\times5^6 + 1\times5^5 + 1\times5^4 + 0\times5^3 + 1\times5^2 + 1\times5^1 + 1\times5^0$

$= (81906)_{10}$

$$\begin{array}{r|l}
4 & 81906 \\ \hline
4 & 20476 - 2 \\ \hline
4 & 5119 - 0 \\ \hline
4 & 1279 - 3 \\ \hline
4 & 319 - 3 \\ \hline
4 & 79 - 3 \\ \hline
4 & 19 - 3 \\ \hline
4 & 4 - 3 \\ \hline
4 & 0 - 1
\end{array}$$

$\therefore (10110111)_5 = (103333302)_4$

(Ans)

Ans to the qustion on 7

Given that.

(1) 412 (4) 134

(1) $(412)_9 = (101001111)_2 = (335)_{10}$

(4) $(134)_9 = (1110000)_2 = (112)_{10}$

$$\begin{array}{r} 101001111 \\ (+)\ 001110000 \\ \hline 110111111 \end{array} \quad \text{and} \quad \begin{array}{r} 335 \\ (+)\ 112 \\ \hline 447 \end{array}$$

Now,

$1\times2^8 + 1\times2^7 + 0\times2^6 + 1\times2^5 + 1\times2^4 + 1\times2^3 + 1\times2^2 + 1\times2^1 + 1\times2^0$

$= 128 + 64 + 0 + 32 + 16 + 8 + 4 + 2 + 1$

$= 447$

Now . subtraction

```
  101001111        &  335
    1110000       (-) 112
(-)               -----
-----------          223
   11011111
```

$\therefore (11011111)_2 = (223)_{10}$

and lastly multiplying.

```
    101001111
      1110000
  ------------
    000000000
   000000000
  000000000
 000000000
000000000
101001111
```

```
        101001111
          1110000
  ---------------
        000000000
       000000000x
      000000000x
     000000000x
    000000000x
   101001111x
  101001111x
 101001111
----------------
1001001010010000
```

and $335 \times 112 = 37520$

$\therefore (1001001010010000)_2 = (37520)_{10}$

$1\times2^{15} + 0\times2^{14} + 0\times2^{13} + 1\times2^{12} + 0\times2^{11} + 0\times2^{10} + 1\times2^{9} + 0\times2^{8} + 1\times2^{7} + 0\times2^{6} + 0\times2^{5} + 1\times2^{4} + 0\times2^{3} + 0\times2^{2} + 0\times2^{1} + 0\times2^{0} = (37520)_{10}$

Ans to the qustion on-8

Given that,

01000010

∴ One's Compement 0111101

Now One's complement number to decimal number=

$1\times2^7 + 0\times2^6 + 1\times2^5 + 1\times2^4 + 1\times2^3 + 1\times2^2 + 0\times2^1 + 1\times2^0$

$= 128 + 0 + 32 + 16 + 8 + 4 + 0 + 1$

$= 189$

Ans to the question - 9

Given that 10111100

One's comp 01000011

$+$ 1

2's com

01000100

$\therefore (01000100)_2$ to decimal

$0\times2^7+1\times2^6+0\times2^5+0\times2^4+0\times2^3+1\times2^2+0\times2^1+0\times2^0$

$=0+64+0+0+0+4+0+0$

$=68$

$\therefore (01000100)_2=(68)_{10}$

(Ans).

Ans to the qustion on 10

a) Given that

$91 - 499$

$= 91 + (-499)$

$(91)_{10} = (1011011)_2$

$(499)_{10} = (111110011)_2$

Now,

$(499)_{10}$ 1s complement $(0111110011)_2$

1000001100

+1

$(499)_{10}$ 2s complement 1000001101

Now,

0001011011

1000001101

$\boxed{1}$ 001100000

overflow.

2	91
2	45 – 1
2	22 – 1
2	11 – 0
2	5 – 1
2	2 – 1
	1 – 0

2	499
2	249 – 1
2	124 – 1
2	62 – 0
2	31 – 0
2	15 – 1
2	7 – 1
2	3 – 1
	1 – 1

Science we are adding two different sign ~~8~~ numbers so there is ~~an~~ no overflow.

∴ Answer is $(001100000)_2$

(b) Given that.

379 + 98

$(379)_{10} = (101111011)_2$

$(98)_{10} = (0110\ 0010)_2$

Now
$$
\begin{array}{r}
010111\,1011 \\
+\ 0001100010 \\
\hline
0111011101
\end{array}
$$

Science we are adding same sign numbers.
there is ~~an~~ no overflow.

∴ Ans is $(011100111011)_2$

Ans to the question on 4

Given that,

RAM cost $(1C2)_{16}$ dollers.

$$\begin{array}{ccc} 1 & C & 2 \\ 0001 & 1100 & 0010 \end{array}$$

$\therefore$ RAM cost $(1C2)_{16} = (0001\ 1100\ 0010)_2 = (450)_{10}$

CPU cost $(10010110000)_2$

$1\times2^{10}+0\times2^{9}+0\times2^{8}+1\times2^{7}+0\times2^{6}+1\times2^{5}+1\times2^{4}+0\times2^{3}+0\times2^{2}+0\times2^{1}+0\times2^{0}$

$=(1200)_{10}$

$\therefore$ CPU costs, $(10010\ 110000)_2 = (1200)_{10}$

Money $=(4064)_8 = (2100)_{10}$

$\therefore$ ~~Left money~~ $= \{(450+2100) -$

$\therefore$ money left $\{2100-(450+1200)\}$

$=(450)_{10}$

Ans