

1)

Day: **MTWTFSS**

Date: ___/___/___

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SEMESTER	3rd SEMESTER
SECTION	B
PAPER	DLD MID EXAM.

Question No 1 :

Convert each of number to required number system :

A) $(1011100.10101)_2 = ()_{10}$

$$\Rightarrow 1 \times 2^6 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 + 1 \times 2^{-1} + 1 \times 2^{-2} + 1 \times 2^{-3}$$

$$\Rightarrow 64 + 16 + 8 + 4 + 0 + 0.5 + 0.0625 + 0.03125$$

$$\Rightarrow 92.59375$$

$$= (92.59375)_{10}$$

B

$$111100.101_2 = ()_{10}$$

$$= 1 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 + 1 \times 2^{-1} + 1 \times 2^{-2}$$

$$= 32 + 16 + 8 + 4 + 0 + 0.5 + 0.0625$$

$$= (60.5625)_{10}$$

2)

$$c) (ABCD)_{16} = ()_2$$

Solution :

A	B	C	D
1010	1011	1100	1101

$$(ABCD)_{16} = (1010101111001101)_2$$

Answer :

$$D) (10)_{16} = ()_{16}$$

$$\frac{10}{16} = 0.625 \times 16 = A$$

Convert each digit to binary

$$(A)_{16} \text{ Answer}$$

$$E) (7777)_8 = ()_{10}$$

$$7^8^3 \quad 7^8^2 \quad 7^8^1 \quad 7^8^0$$

$$7 \times 512 + 7 \times 64 + 7 \times 8 + 7$$

$$3584 + 448 + 56 + 7$$

$$(4095)_{10}$$

$$F) (7777)_8 = ()_2$$

$$(111111111111)_2 \text{ Answer}$$

G) $(7777)_8 = ()_{16}$

$(7777)_8 = (4095)_{16}$

$\frac{4095}{16} = 255.9375 \quad 16 \times 0.9375$

$\frac{255}{16} = 15.9375 \quad 16 \times 937$

$\frac{15}{16} = 0.9375 \quad 16 \times 937$

$(FFF)_{16}$

H $(10101111)_2 = ()_8$

$\begin{array}{cccc} 1 & 0 & 1 & 0 & 1 & 1 & 1 & 1 \\ \hline \downarrow & & \downarrow & & \downarrow & & & \\ 2 & & 5 & & 7 & & & \end{array}$

$= (257)_8$ Answer.

I

(98)

$\begin{array}{cc} 98 \\ 1001 & 1000 \\ (1001 & 1000)_{BCD} \end{array}$

$$j) (101010)_{10} = (\quad)_8$$

Solution

$$\frac{101010}{8} = 12626.25 \quad 0.25 \times 8 = 2$$

$$\frac{12626}{8} = 1578.25 \quad .25 \times 8 = 2$$

$$\frac{1578}{8} = 197.25 \quad .25 \times 8 = 2$$

$$\frac{197}{8} = 24.625 \quad .625 \times 8 = 5$$

$$\frac{24}{8} = 3$$

$$(35222)_8 \quad \text{Answer.}$$

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Question NO 2:

A)

$$\overline{A\overline{B}} (C + \overline{D})$$

Solution:

$$= \overline{A\overline{B}} + (C + \overline{D})$$

$$= \overline{A} + \overline{\overline{B}} + \overline{C} + \overline{\overline{D}}$$

$$= \overline{A} + B + \overline{C} + D$$

Answer.

B)

$$A + \overline{B} + C + \overline{D} + ABC\overline{D}$$

Solution:

$$= \overline{A}\overline{\overline{B}}\overline{C}\overline{\overline{D}} + \overline{A} + \overline{B} + \overline{C} + \overline{\overline{D}}$$

$$= \overline{A}B\overline{C}D + \overline{A} + \overline{B} + \overline{C} + D$$

Answer.

Question No 3:

$$\bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}z + \bar{x}yz + xy\bar{z}$$

Truth table:

x	y	z	
0	0	0	$\bar{x}\bar{y}\bar{z} = 1$
0	0	1	0
0	1	0	$\bar{x}y\bar{z} = 1$
0	1	1	$\bar{x}yz = 1$
1	0	0	0
1	0	1	$x\bar{y}z = 1$
1	1	0	$x\bar{y}\bar{z} = 1$
1	1	1	0

B $A\bar{B}CD + A B\bar{C}\bar{D} + \bar{A}\bar{B}CD + \bar{A}B\bar{C}\bar{D}$

Truth Table :

A	B	C	D	
0	0	0	1	$\rightarrow A\bar{B}\bar{C}\bar{D}$
0	0	0	0	0
0	0	1	1	$\rightarrow \bar{A}\bar{B}CD = 1$
0	0	1	0	$\rightarrow \bar{A}\bar{B}C\bar{D} = 1$
0	1	0	1	0
0	1	0	0	0
0	1	1	1	0
0	1	1	0	0
1	0	0	1	0
1	0	0	0	0
1	0	1	1	0
1	0	1	0	0
1	1	0	1	$\rightarrow A\bar{B}\bar{C}\bar{D} = 1$
1	1	0	0	0
1	1	1	1	0
1	1	1	0	0

Question No 4

A)

$$\begin{aligned}
 & BC + DE (B\bar{C} + DE) \\
 &= BC + B\bar{C}DE + DE \cdot DE \\
 & \hspace{15em} DE \cdot DE = DE \\
 &= BC + B\bar{C}DE + DE \\
 &= B\bar{C} + DE (B\bar{C} + 1) \\
 &= BC + DE
 \end{aligned}$$

B) $B C (\bar{C} \bar{D} + CE)$

$$\begin{aligned}
 & B C \bar{C} \bar{D} + B C C E \\
 & \text{By rule No. 8 } A \cdot \bar{A} = 0
 \end{aligned}$$

$$\begin{aligned}
 & B \cdot 0 \cdot \bar{D} + B C C E \\
 & B C C E
 \end{aligned}$$

$$\text{By rule No 7 } C \cdot C =$$

$$B C E$$

C) $B + C [BD + (C + \bar{D})E]$

$$B + C [BD + CE + DE]$$

$$B + BCD + CCE + C\bar{D}E$$

$$\text{By rule No 7 } C \cdot C = C$$

$$B + BCD + CE + C\bar{D}E$$

$$\text{By rule no 10 } A + AB = A$$

$$B + CE (1 + \bar{D})$$

$$\text{By rule No 2 } \bar{A} + 1 = 1$$

$$B + CE (1)$$

$$B + CE$$

Answer.