

Day: **MTWTF**S

Date: ___/___/___

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DEP: Software

SEM: 3rd

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SUB: DLD

QUESTION No:1

Convert each of number to required number system.

(A) $(1011100.10101) = (\quad)_{10}$

SOLUTION:

$$= 1 \times 2^6 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^{-1} + 1 \times 2^{-2} + 1 \times 2^{-5}$$

$$= 64 + 16 + 8 + 4 + 0.5 + 0.0625 + 0.03125$$

$$= 92.59375$$

$(92.59375)_{10}$ Ans.

(B) 111100.101

SOLUTION:

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

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

$$(60.5625)_{10}$$

(C) $(ABCD)_{16}$

SOLUTION:

$$A = 1010, B = 1011, C = 1100, D = 1101$$

$$(1010101111001101)$$

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

SOLUTION:

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

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

$$(E) (7777)_8$$

SOLUTION:

$$7 \times 8^3 + 7 \times 8^2 + 7 \times 8^1 + 7 \times 8^0$$

$$3584 + 448 + 56 + 7$$

$$(4095)_{10} \text{ Ans}$$

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

$$(111111111111)_2$$

$$(G) (7777)_8$$

SOLUTION:

$$(7777)_8 = (4095)_{10}$$

$$\frac{4095}{16} = 255.9375 \Rightarrow 16 \times 0.9375 = 15(F)$$

$$\frac{255}{16} = 15.9375 \Rightarrow 16 \times 0.9375 = 15(F)$$

16

$$\frac{15}{16} = 0.9375 \times 16 = 15_F$$

16

$$(FFF)_{16}$$

$$(H) (1010111)_2 = (\dots)_8$$

$$01010111$$

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

$$(257)_8$$

$$(i) (101010)_{10} = (\dots)_8$$

SOLUTION:

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

$$\frac{12626}{8} = 1578.25 \Rightarrow 0.25 \times 8 = 2$$

$$\frac{1578}{8} = 197.25 \Rightarrow 0.25 \times 8 = 2$$

$$\frac{197}{8} = 24.625 \Rightarrow 0.625 \times 8 = 5$$

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

$$(35222)_8 \text{ Ans.}$$

$$(ii) (98)_{10} = (\dots)_{BCD}$$

SOLUTION:

$$\begin{array}{r} 98 \\ \hline 1001 \quad 1000 \end{array}$$

$$(10011000)_{BCD} \text{ Ans.}$$

Q2 Apply De-Morgan's theorems to each expression.

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

SOLUTION:

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

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

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

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

SOLUTION:

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

Question No 3:

$$A \quad \bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}z + \bar{x}yz + xyz$$

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	$xyz = 1$
1	1	1	0

B

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

Truth Table :

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

Question No 4

$$\begin{aligned}
 \text{A)} \quad & BC + DE (B\bar{C} + DE) \\
 &= BC + B\bar{C}DE + DE \cdot DE \\
 &= BC + B\bar{C}DE + DE \quad DE \cdot DE = DE \\
 &= BC + DE (B\bar{C} + 1) \\
 &= BC + DE
 \end{aligned}$$

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

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

$$\text{By rule No. 8 } A \cdot \bar{A} = 0$$

$$B \cdot 0 \cdot \bar{D} + B C C E$$

$$B C C E$$

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

$$B C E$$

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

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

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

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

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

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

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

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

$$B + CE (1)$$

$$B + CE \quad \text{Answer.}$$