

NAME

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ID

(15837)

SUBJECT

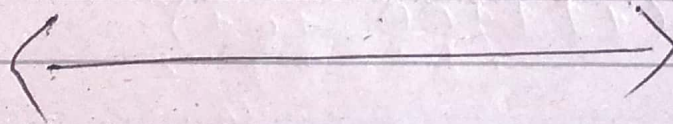
Digital Logical &
Design

Department

BS(SE) - 3

SEC

(4)



(1)

Q NO 1: convert each of the number to required number system.

(A) $(101110010101)_2 = (\quad)_{10}$

Sol.

$$(101110010101)_2 = (\quad)_{10}$$

$$(1195)_{10}$$

(B)

$$(111100101)_2 = (\quad)_{10}$$

Sol.

$$(111100101)_2 = (\quad)_{10}$$

$$000111100101 = (\quad)_{10}$$

$$(1145)_{10}$$

(C)

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

Sol.

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

$$(101010111001101)_2$$

$$A = 1010$$

$$B = 1011$$

$$C = 1100$$

$$D = 1101$$

$$(P10)$$

(2)

(D)

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

Sol

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

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

$$0.625 \times 16 = 10 = 1$$

$$= (1)_{16}$$

(E)

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

Sol

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

$$7 \times 8^3 + 7 \times 8^2 + 7 \times 8^1 + 7 \times 8^0$$
$$3584 + 448 + 56 + 7$$
$$(4095)_{10}$$

(F)

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

Sol

In truth table of octal

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

$$7 = 111$$

$$(111111111111)_2$$

P.T.O

(3)

(G) $(7777)_9 = (?)_{16}$

Sol: $(7777)_9 = (?)_{16}$

$\frac{7777}{16} = 486.0625 = 0.0625 \times 16 = 1$

$\frac{486}{16} = 30.375 = 0.375 \times 16 = 6$

$\frac{30}{16} = 1.875 = 0.875 \times 16 = 14 = 1$

$\frac{1}{16} = 0.0625 = 0.625 \times 16 = 1$

$(1161)_{16}$

(H) $(10101111)_2 = (?)_8$

Sol: $\underbrace{01010}_2 \underbrace{1111}_5 = (?)_8$

in truth table of OR

$(257)_8$

(I) $(101010)_{10} = (?)_8$

Sol.

$(101010)_{10} = (?)_8$

$\frac{101010}{8} = 12625.015 = 0.25 \times 8 = 2$

$\frac{12625}{8} = 1578.125 = 0.125 \times 8 = 1$

$\frac{1578}{8} = 197.25 = 0.25 \times 8 = 1$

(4)

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

$$\frac{24}{8} = 3 = 0.3 \times 8$$

$$(3511)_8$$

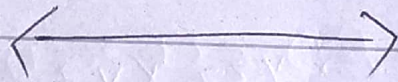
(5)

$$(98)_{10} = (\quad)_{BCD}$$

Sol,

$$(98)_{10} = (\quad)_{BCD}$$

$$(10011000)_{BCD}$$



Q no 2: Apply De-Morgan theorem, to each expression.

(A)

Sol

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

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

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

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

$$\bar{B} = B$$

$$\bar{\bar{D}} = D$$

(B)

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

Sol

P+0

(J)

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

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

$$(\overline{A} \overline{B} \overline{C} \overline{D}) + (\overline{A+B+C+D}) \quad \begin{matrix} \overline{D} = \overline{D} \\ \overline{B} = \overline{B} \end{matrix}$$



Q. 10) Develop a truth table for each of following SOP expression

(A) $\overline{x} \overline{y} \overline{z} + \overline{x} y \overline{z} + x \overline{y} \overline{z} + \overline{x} y z + x y \overline{z}$

Sol. truth table for

$$\overline{x} \overline{y} \overline{z} + \overline{x} y \overline{z} + x \overline{y} \overline{z} + \overline{x} y z + x y \overline{z}$$

x	y	z	
0	0	0	$\overline{x} \overline{y} \overline{z} = 1$
0	0	1	$\rightarrow 0$
0	1	0	$\overline{x} y \overline{z} = 1$
0	1	1	$\overline{x} y z = 1$
1	0	0	$\rightarrow 0$
1	0	1	$x \overline{y} \overline{z} = 1$
1	1	0	$x \overline{y} \overline{z} = 1$
1	1	1	$\rightarrow 0$

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

Sol.

P. 10

(6)

truth table for $\bar{A}\bar{B}C\bar{D} + A\bar{B}C\bar{D} + A\bar{B}C\bar{D} + A\bar{B}C\bar{D}$

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

no 9
 sum of product (SOP) form

(A) $BC + DE (B\bar{C} + DE)$

sol:

$BC + DE (B\bar{C} + DE)$

$BC + DE B\bar{C} + DE DE$

$BC + DE B\bar{C} + DE$

$D \cdot D = D$

$D + D$

(7)

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

Sol.

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

$$BC\bar{C}\bar{D} + BCCE$$

$$0 + BCCE$$

$$BCE$$

$$C \cdot \bar{C} = 0$$

$$C \cdot C = C$$

C)

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

Sol.

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

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

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

$$C \cdot C = C$$

