

Name

AsFand yar Safdar

ID

12982

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Paper

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Department

Tele Com

QNo1

Part (b) convert each of the following

Part (c)

$$(3A6F)_{16} = (?)_2$$

$$3 = 0011$$

$$A = 1010$$

$$6 = 0110$$

$$F = 1111$$

Answer

$$(3A6F)_{16} = (0011101001101111)_2$$

Part (d)

$$(45.25)_{10} = (?)_2$$

2	45	
2	22	1
2	11	0
2	5	1
2	2	1
	1	0

$$0.25 \times 2 = 0$$

$$0.5 \times 2 = 1$$

Answer

$$(101101.01)_{2}$$

Part (B)

$$(0111111 \cdot 1010)_2 = (?)_{10}$$

$$(0 \times 2^7) + (1 \times 2^6) + (1 \times 2^5) + (1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (1 \times 2^0)$$

$$(1 \times 2^{-1}) + (0 \times 2^{-2}) + (1 \times 2^{-3}) + (0 \times 2^{-4})$$

$$64 + 32 + 16 + 8 + 4 + 2 + 1 + 0.5 + 0.125$$

~~(127)~~
10

Answer \rightarrow

$$127.625_{10}$$

Part (F)

$$(156)_{10} = (?)_{BCD}$$

1 5 6

$$8421 \quad 8421 \quad 8421$$

$$0001 \quad 0101 \quad 0110$$

\Rightarrow Answer

$$(0001 \ 0101 \ 0110)_2$$

(Part h)

$$111000 = (?101001) \text{ even parity}$$

101001 is odd since, it is not divisible by 2

As remainder is equal to 1 when divided by 2

(Part d)

$$10101010_2 = \underline{\underline{?}}_{10}$$

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

$$\cancel{1 \times 128 + 0 \times 64 + 32 + 0 \times 16 + 1 \times 8 + 2}$$

$$\cancel{+} 128 + 32 + 8 + 2$$

$$\Rightarrow (170)_{10}$$

Q2

Question No 2

Part 1

$$9B_{10} + 8A_{16}$$

$$\begin{array}{r} 9B_{16} \\ + 8A_{16} \\ \hline \end{array}$$

15 Ans

ان کا

$$11 + 10 = 21$$

$$21 = 16 + 5$$

15

Part B

$$F7_{16} - D6_{16}$$

$$\begin{array}{r} F7_{16} \\ - D6_{16} \\ \hline \end{array}$$

⇒ 21 Ans

F=15

D=13

Answer

Part 3

$$(1100)_2 + (1011)_2$$

$$\begin{array}{r} 1100 \\ + 1011 \\ \hline 10111 \end{array}$$

Sum = 0
Carry = 1

Answer

Part 4

$$0111111 - 0000111_2$$

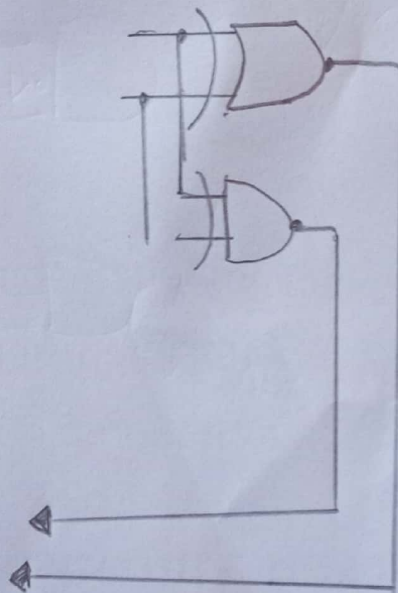
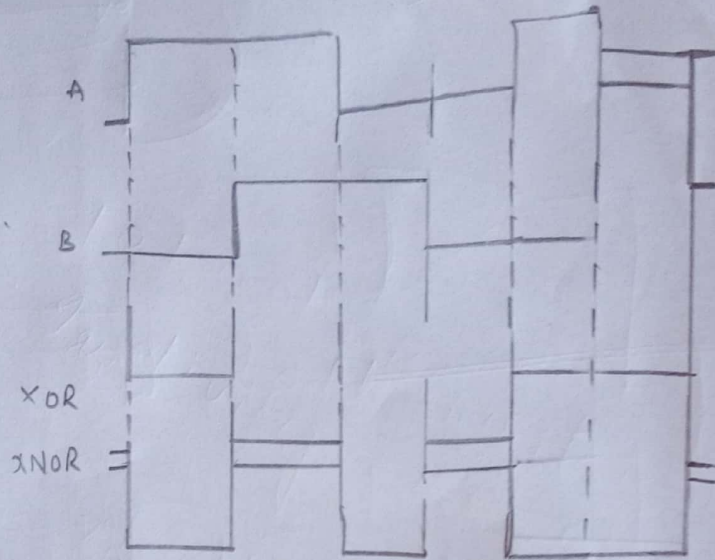
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$$\begin{array}{r} 0111111 \\ - 0000111 \\ \hline \end{array}$$

$$\boxed{1111000}$$

Answer

Question No \Rightarrow 03.

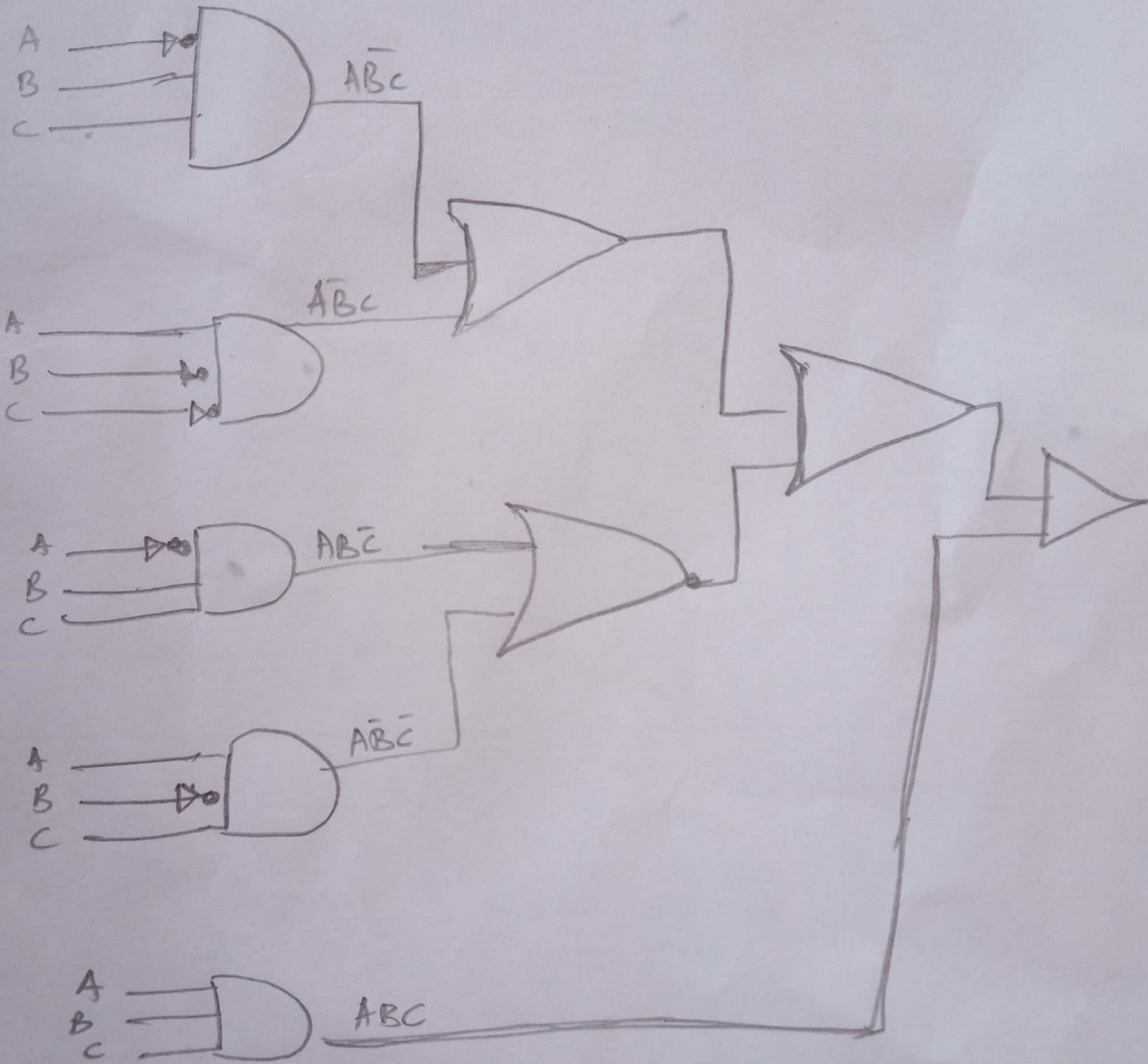


\Rightarrow XOR output is High only when both inputs are at opposite level

\Rightarrow XNOR output is High when Both inputs are Same.

Q No \Rightarrow 04 (A)

~~Part B~~



$X = \bar{A}BC + A\bar{B}C + ABC + ABC$

Q No 4 Part B

→ Simplify the expressions

$$X = \bar{A}BC + A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} + \bar{A}BC$$

Solution

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

$$= BC(1) + A\bar{B}(\bar{C}+C) + \bar{A}\bar{B}\bar{C}$$

$$= BC + A\bar{B}(1) + \bar{A}\bar{B}\bar{C}$$

$$= BC + A\bar{B} + \bar{A}\bar{B}\bar{C} \quad \text{(Rule 4 drop 1)}$$

$$= BC + \bar{B}(A + \bar{A}\bar{C}) \quad \text{(Factor B for standard)}$$

$$= BC + \bar{B}(A + \bar{C}) \quad \text{(Applying rule " } A + \bar{A}\bar{C} = A + \bar{C} \text{)}$$

$$\Rightarrow \underline{\underline{BC + A\bar{B} + \bar{B}\bar{C}}}$$

Answer

QNO5.

Part A

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

$$\therefore \overline{x + y + z} = \overline{(x + y)} \bar{z}$$

$$= (x + y) \bar{z}$$

$$\Rightarrow x\bar{z} + y\bar{z} \quad \underline{\text{Ans}}$$

Part B

$$x\bar{z} + y\bar{z} \rightarrow \text{Pos Form}$$

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

$$\bar{z}(x + y) \rightarrow \text{Pos}$$

Q5 (Part)

SOP truth table

input			output
x	y	z	
0	0	1	$\bar{x}y z$
0	0	1	$x y \bar{z}$

POS Form

Inputs			output
x	y	z	
0	0	1	$x + y$
0	0	1	$x + y$

QNO 6

Part A

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

$$\overline{A}\overline{B}\overline{C} = 000$$

$$\overline{A}B\overline{C} = 001$$

$$\overline{A}B\overline{C} = 010$$

$$A\overline{B}\overline{C} = 110$$

$$A\overline{B}C = 111$$

$$A\overline{B}C = 101$$

Q6 Part B

Pos Form

AB	c	0	1
00			1
01	1		
11	1		1
10			1

$$X = A\bar{B}\bar{C} + \bar{A}B\bar{C} + AB\bar{C} + ABC + A\bar{B}C$$