Answers

Q.1 ⇒ (a)

Q.2 ⇒ (c)

Q.3 ⇒ (b)

Q.4 ⇒ (d)

Q.5 ⇒ (a)

Q.6 ⇒ (c)

Q.7 ⇒ (d)

Q.8 ⇒ 11

Q.9 ⇒ $(241)_9$

Q.10 ⇒ (b)

04/09/2020 Tutorial - 01 (CAM) ~ CSN-221

Q 1.

$(48)_{10} = (00110000)_2$

1's complement $\Rightarrow$ 11001111

2's complement $\Rightarrow$ 11010000

$(23)_{10} = (00010111)_2$

1's complement $\Rightarrow$ 11101000

2's complement $\Rightarrow$ 11101001

$$\Rightarrow (-48)_{10} + (-23)_{10} = \begin{array}{r} 11010000 \\ +\ 11101001 \\ \hline 1\,|\,10111001 \end{array}$$

Now, 10111001 is 2's complement of –

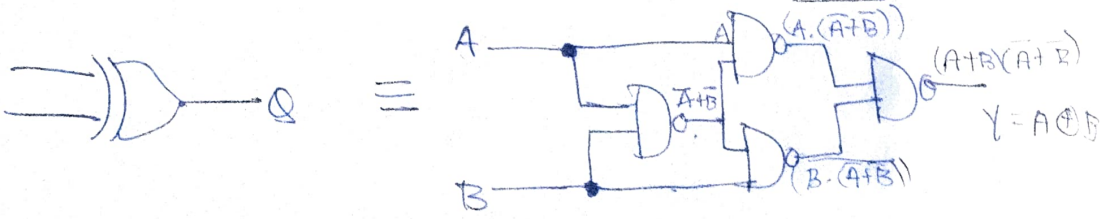
1's comp. $\Rightarrow$ 01000110

2's $\Rightarrow$ 01000111 $= (71)_{10}$

$\Rightarrow (10111001)_{2\text{'s comp.}} = (-71)_{10}$.

[Option : (a)]

Q 2. Using NAND gates –

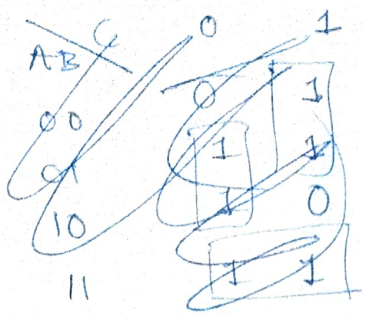


$\therefore Y = A\bar{B} + \bar{A}B$

$= (A+B).(\bar{A}+\bar{B})$

Option : (c)

Q.3. $f(A,B,C) \rightarrow$



AB \ C	0	1
00	0	1
01	1	1
11	1	1
10	1	0

~~$f(A,B,C) = \bar{A}C +$~~

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

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

$\Rightarrow f(A,B,C) = (\bar{B}(\bar{A}C + A\bar{C}))'$

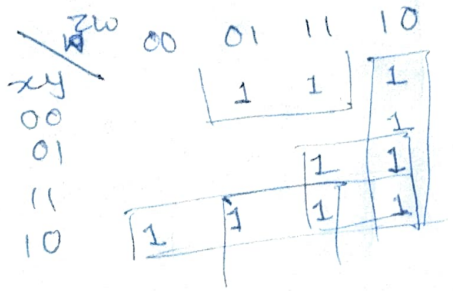
$= (\bar{B}(AC + \bar{A}\bar{C}))'$

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

Option : (b)

Q.4. $f = w\bar{x}\bar{y}\bar{z} + \bar{x}\bar{y}z + \bar{w}\bar{x}yz + x\bar{y}\bar{z} + x\bar{y}z + xyz$

~~$f = \bar{y}\bar{z} +$~~



xy \ zw	00	01	11	10
00		1	1	1
01				1
11			1	1
10	1	1	1	1

$f = x\bar{y} + \bar{y}w + xz + \bar{w}z$

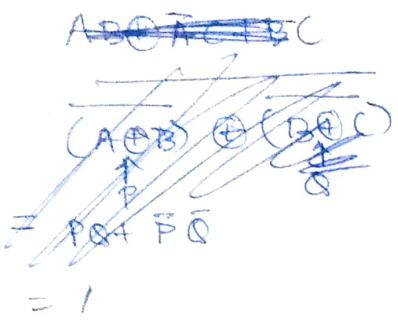
Option : (d)

Q.5.

a → $(A \oplus B) \oplus (B \oplus C)$

$= A \oplus (B \oplus B) \oplus C = (A \oplus 0) \oplus C$

$= A \oplus C$ ⇒ a → 4



b → $(A \odot B) \odot (B \odot C)$

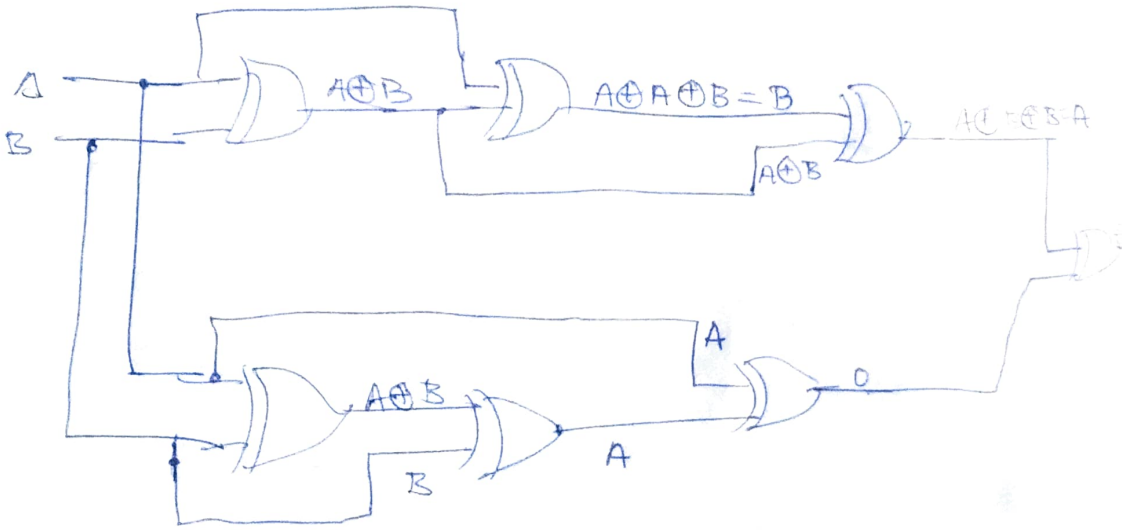
$= A \odot (B \odot B) \odot C$

$= [A \odot 1] \odot C$

$= A \odot C$ ⇒ c → 1

⇒ **Option: (a)**

Q.6.



Option: (c)

~~Option: (a)~~

Q.7. $f(A,B,C,D) \rightarrow$

AB \ CD	00	01	11	10
00			1	
01	1	1	1	
11		1	1	1
10		1		

Highlighted part shows BD, $\bar{C}DA$, DAB, $\bar{C}\bar{A}B$

⇒ All are prime implicants but "DAB" is not an essential prime implicant.

⇒ **Option : (d)**

Q.8.

AB \ CD	00	01	11	10
00			1	1
01	1	1		
11				
10	1	1	1	

~~Correct~~

⇒ ~~$f = \bar{A}B + A\bar{B} + A$~~

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

⇒ No. of literals = 12

Q. 8.

AB \ CD	00	01	11	10
00	1			
01				
11				
10				

Q. 8.

AB \ CD	00	01	11	10
00			1 1	1
01		1 1		
11				
10		1 1		

1

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

$= (A + 1$

Q. 8.

AB \ CD	00	01	11	10
00	1			
01			1 1	
11	1 1		1 1	
10			1	

$f = \overline{(AB + BC + ACD + \bar{A}B\bar{C}\bar{D})}$

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

$\Rightarrow$ No. of literals = 11

Q-9. $(36)_7 = 21+6 = (27)_{10}$

$(67)_8 = 48+7 = (55)_{10}$

$(98)_{10} = (98)_{10}$

$(34)_5 = 15+4 = (19)_{10}$

$\Rightarrow$ Ans- $(199)_{10}$

$199 \div 9 = 22$ rem = 1

$22 \div 9 = 2$ rem = 4

$2 \div 9 = 0$ rem = 2

$\Rightarrow \boxed{(199)_{10} = (241)_9}$

Q-10. ~~Option~~ Option: (b)