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2019CS10369

Problem-2:-

ENTRY NUMBER-2019CS10369.

Required digits are 0,1,2,3,6,9.

a b c d : denotes  
digits in order.

OUTPUT OF A:-

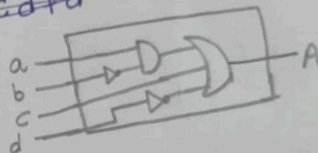
	c d			
	00	01	11	10
a b	1	0	1	0
01	-	-	1	1
11	-	-	-	-
10	-	1	-	-

$$\bar{c}\bar{d} + a\bar{b} + \bar{a}c$$

$$\bar{c}\bar{d} + a\bar{b} + c$$

$$= a\bar{b} + c\bar{d} + \bar{c}\bar{d}$$

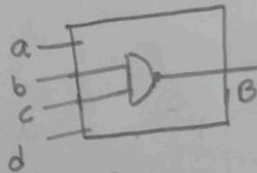
$$c + \bar{d} + a\bar{b}$$



OUTPUT OF B

1	1	1	1
-	-	1	0
-	-	-	-
-	1	-	-

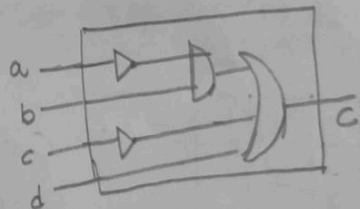
$$\bar{a}\bar{b} + \bar{c} + a\bar{b} = \bar{b} + \bar{c}$$



OUTPUT OF C

1	1	1	0
-	-	-	1
-	-	-	-
-	1	-	-

$$\bar{c} + d + \bar{a}b$$

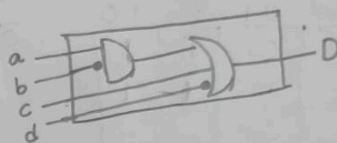


OUTPUT OF D  
= = = =

1	0	1	1
-	-	-	1
-	-	-	-
-	1	-	-

Same as A

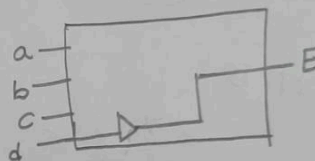
$$\begin{aligned} & \bar{c}\bar{d} + a\bar{b} + c \\ &= \bar{c}\bar{d} + a\bar{b} + cd + c\bar{d} \\ &= a\bar{b} + cd + \bar{d} = c + \bar{d} + a\bar{b} \end{aligned}$$



OUTPUT OF E:-  
= = = =

1	0	0	1
-	-	-	1
-	-	-	-
-	0	-	-

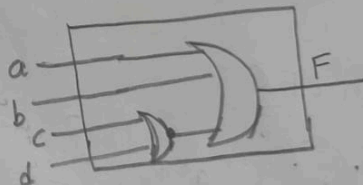
$$\bar{c}\bar{d} + c\bar{d} = \bar{d}$$



OUTPUT OF F:-  
= = = =

1	0	0	0
-	-	-	1
-	-	-	-
-	1	-	-

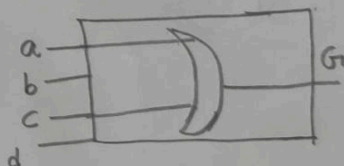
$$a + b + \bar{c}\bar{d} = a + b + \bar{c} + \bar{d}$$



OUTPUT OF G:-  
= = = =

0	0	1	1
-	-	-	1
-	-	-	-
-	1	-	-

$$c + a$$





Separate outputs are:

TOTAL COST  
= 3 OR + 1 AND

$$A : a\bar{b} + c + \bar{d}$$

$$B : \bar{b} + \bar{c}$$

$$C : \bar{c} + d + \bar{a}\bar{b}$$

$$D : a\bar{b} + c + \bar{d} = A$$

$$E : \bar{d}$$

$$F : a + b + \bar{c}\bar{d} = a\bar{b} + b + \bar{c}\bar{d}$$

$$G : a + c$$

Y OR

For total circuit, we can use <sup>three</sup> ~~two~~ AND Gates for  $a\bar{b}$  and  $\bar{c}\bar{d}$  and  $\bar{a}\bar{b}$

Since, two of them are already equal.  
6 OR Gates are enough for final outputs.

Total cost = 9 Gates [ $\because$  NOT Gates do not have any cost].

