Physicsaholics

DPP – 3

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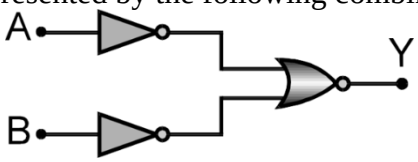
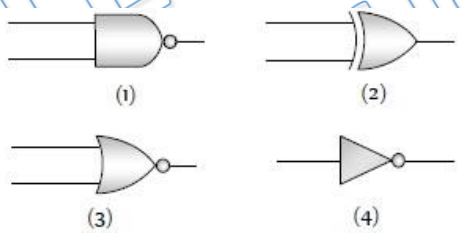
Q 1. Which logic gate is represented by the following combination of logic gates –



(a) OR (b) NAND
(c) AND (d) NOR

Q 2. Add binary numbers 101 + 110 = ?
(a) 1011 (b) 1001
(c) 0111 (d) 111

Q 3. Given below are symbols for some logic gates. The XOR gate and NOR gate respectively are



(a) 1 and 2 (b) 2 and 3
(c) 3 and 4 (d) 1 and 4

Q 4. The following truth table corresponds to the logic gate

A	0	0	1	1
B	0	1	0	1
X	0	1	1	1

(a) NAND (b) OR
(c) AND (d) XOR

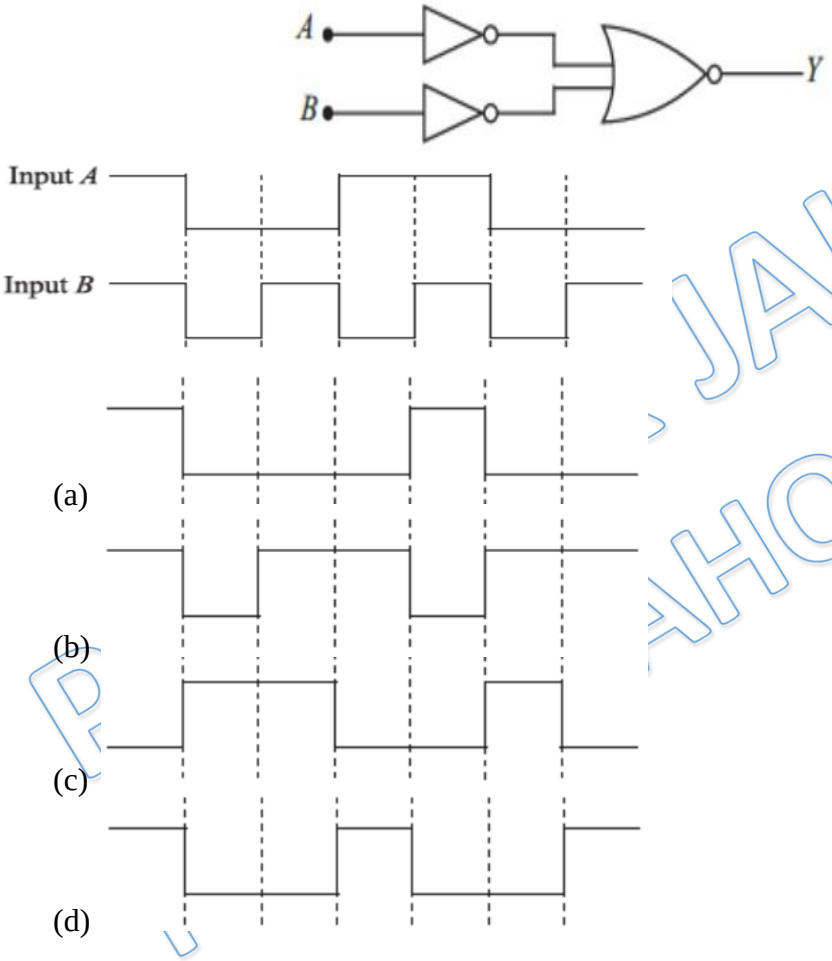
Q 5. What will be the input of A and B for the Boolean expression $\overline{(A+B)}.\overline{(A\cdot B)} = 1$
(a) 0, 0 (b) 0, 1
(c) 1, 0 (d) 1, 1

Q 6. Which of the following logic gate is an universal gate
(a) OR (b) NOT

(c) AND (d) NOR

Q 7. Boolean algebra is essentially based on
(a) Truth
(b) Logic
(c) Symbol
(d) Numbers

Q 8. The logic circuit shown below has the input waveforms 'A' and 'B' as shown. Pick out the correct output waveform



(a)

(b)

(c)

(d)

Q 9. The truth table for NOT gate is

(a)

Input	output
1	1
0	0

(b)

Input	output
1	0
0	0

(c)

Input	output
1	0
0	1

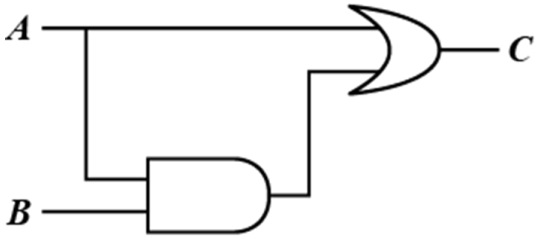
(d)

Input	output
0	1
1	1

Q 10. In the Boolean algebra, the following one is wrong

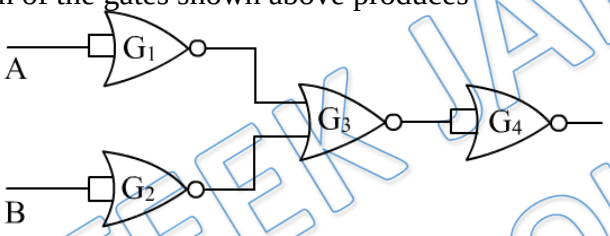
(a) 1.0 = 0
(b) 0.1 = 0
(c) 1.1 = 0
(d) 1.1 = 1

Q 11. For the combination of gates shown here, which of the following truth table part s not true?



(a) A = 0, B = 1, C = 1
(b) A = 0, B = 0, C = 0
(c) A = 1, B = 1, C = 1
(d) A = 1, B = 0, C = 1

Q 12. The combination of the gates shown above produces

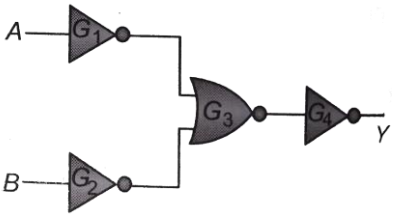


(a) AND gate
(b) XOR gate
(c) NOR gate
(d) NAND gate

Q 13. The combination of gates shown below yields

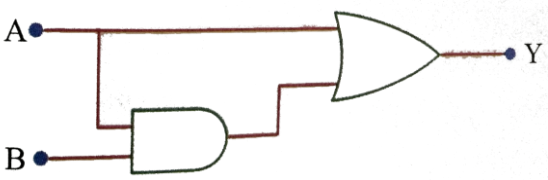
(a) NAND gate
(b) OR gate
(c) NOT gate
(d) XOR gate

Q 14. The combination of gates shown below produces



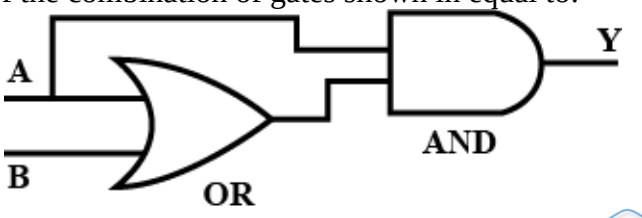
(a) AND gate
(b) XOR gate
(c) NOR gate
(d) NAND gate

Q 15. The output of the combination of the gates shown in the figure below is



(a) $A + (A.B)$ (b) (A+B) A + $\bar{B}$
(c) (A.B) + $(\bar{A}.\bar{B})$ (d) (A+B) $(\overline{A.B})$

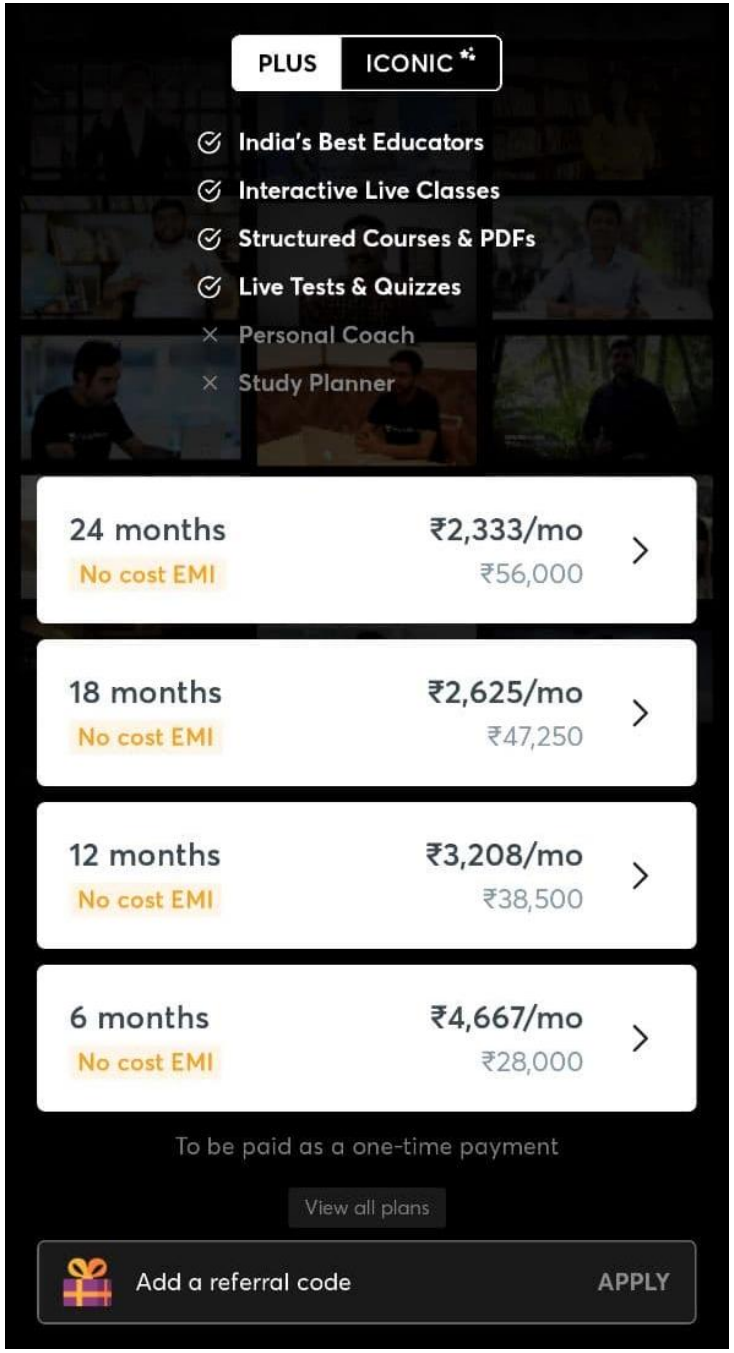
Q 16. The output Y of the combination of gates shown in equal to:



(a) A (b) $\bar{A}$
(c) $A + B$ (d) $A.B$

Answer Key

Q.1 c	**Q.2 a**	**Q.3 b**	**Q.4 b**	**Q.5 a**
Q.6 d	**Q.7 b**	**Q.8 a**	**Q.9 c**	**Q.10 c**
Q.11 a	**Q.12 d**	**Q.13 b**	**Q.14 d**	**Q.15 a**
Q.16 a				



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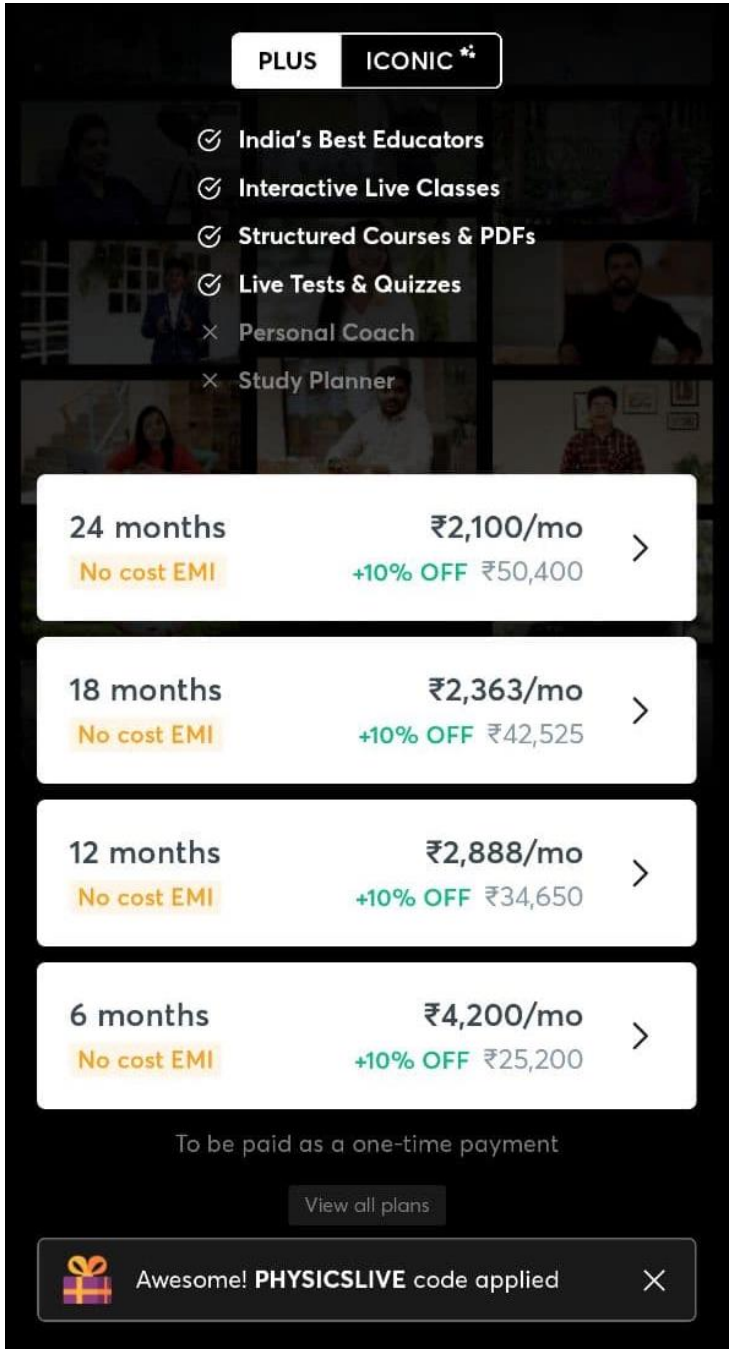
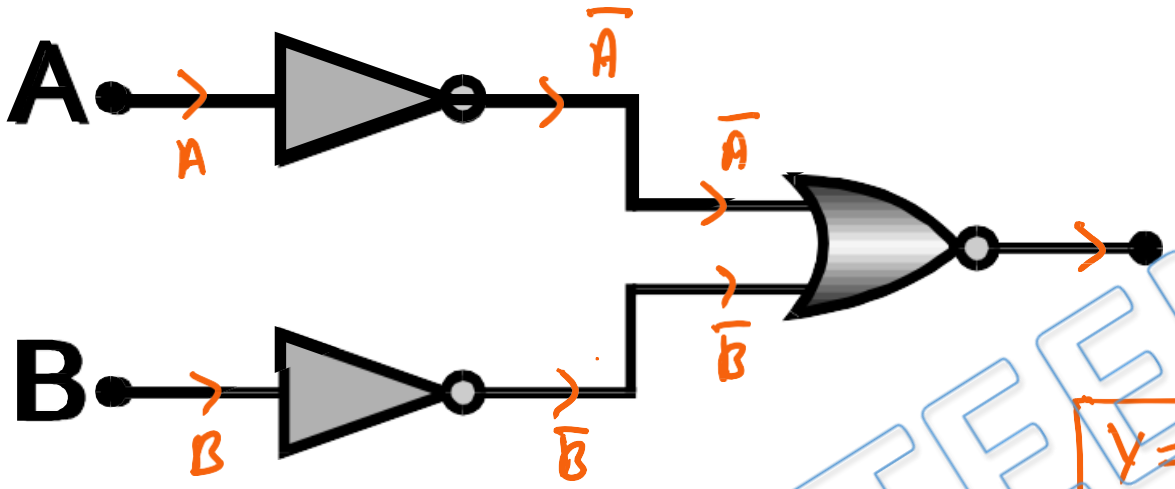


NEET & JEE Main
Written Solution

DPP-3 Semi Conductors: Logic Gates & Digital Electronics

By Physicsaholics Team

Solution: 1



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

$= A \cdot B$

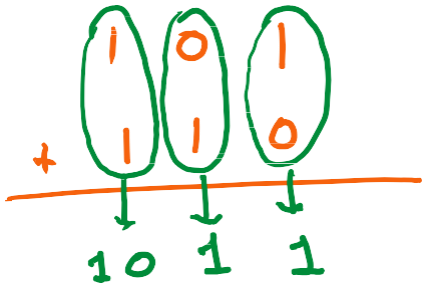
$Y = A \cdot B$

AND gate

Ans

Ans. c

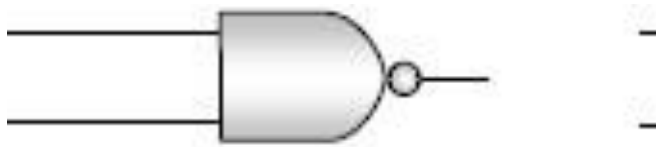
Solution: 2



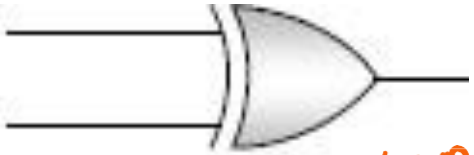
So; 101 + 110 = 1011 Ans

Ans. a

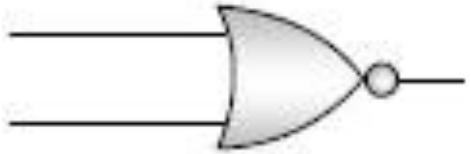
Solution: 3



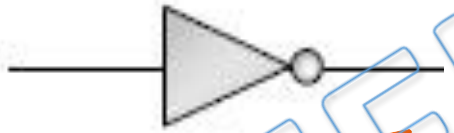
(1) NAND gate.



(2) XOR gate



(3) NOR gate



(4) NOT gate.

Ans. b

Solution: 4

A	0	0	1	1
B	0	1	0	1
X	0	1	1	1

A	+	B	=	X
0		0		0
0		1		1
1		0		1
1		1		1

Correct truth table

So; $X = A + B$

OR gate

Ans.

Ans. b

Solution: 5 $\overline{(A+B)}\,.\,\overline{(A.B)} = 1$

(b)

For output;

$$Y = \overline{(A+B)} \cdot \overline{(A \cdot B)}$$

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

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

$$= \bar{A} \cdot \bar{B} + \bar{A} \cdot \bar{B}$$

$$= \bar{A} \cdot \bar{B}$$

$$\boxed{Y = \overline{A+B}}$$

So; (a) 0, 0

$$Y = \overline{(0+0)} = 1$$ ✓

Ans

Ans. a

Solution: 6

NOR gates are considered as universal gates, because all the gates like AND, OR, NOT can be obtained by using only NOR gates.

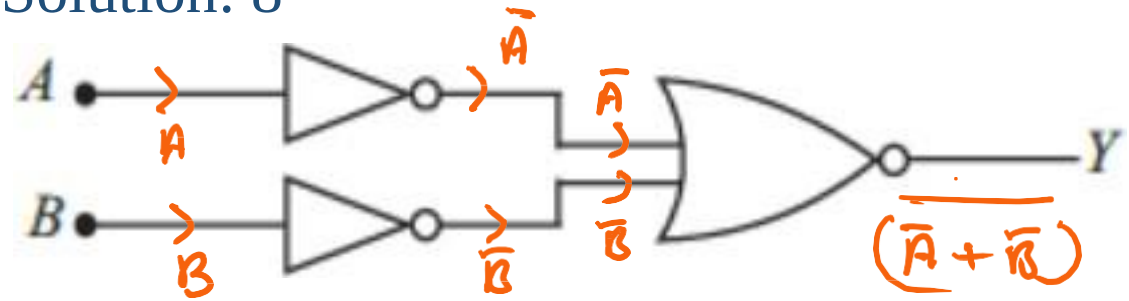
Ans. d

Solution: 7

Boolean algebra is essentially based on logic. It is also known as logical algebra.

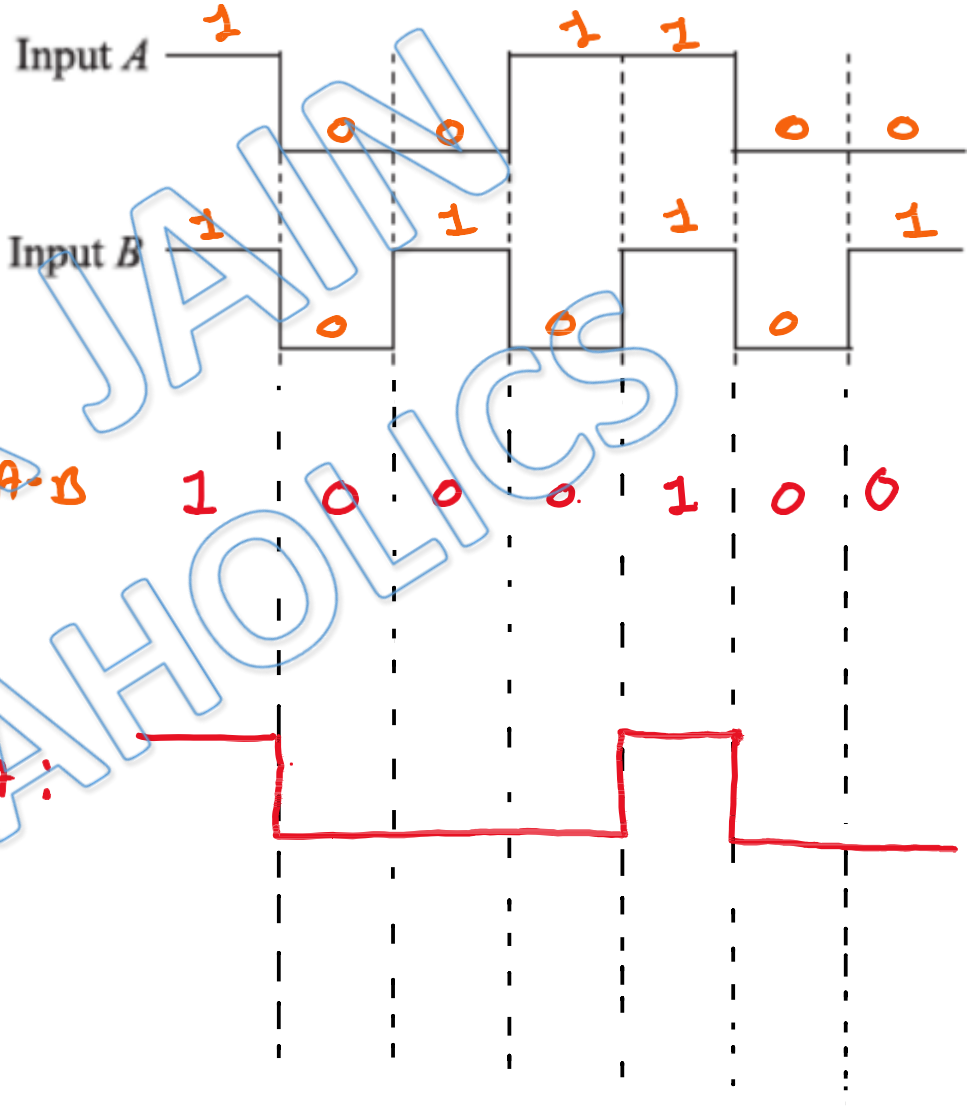
Ans. b

Solution: 8



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

$$Y = A \cdot B$$



Ans. a

Solution: 9

NOT gate gives the reverse of the input as output. Truth table for NOT gate is:

Input	output
1	0
0	1

Ans. c

Solution: 10

In the Boolean algebra,

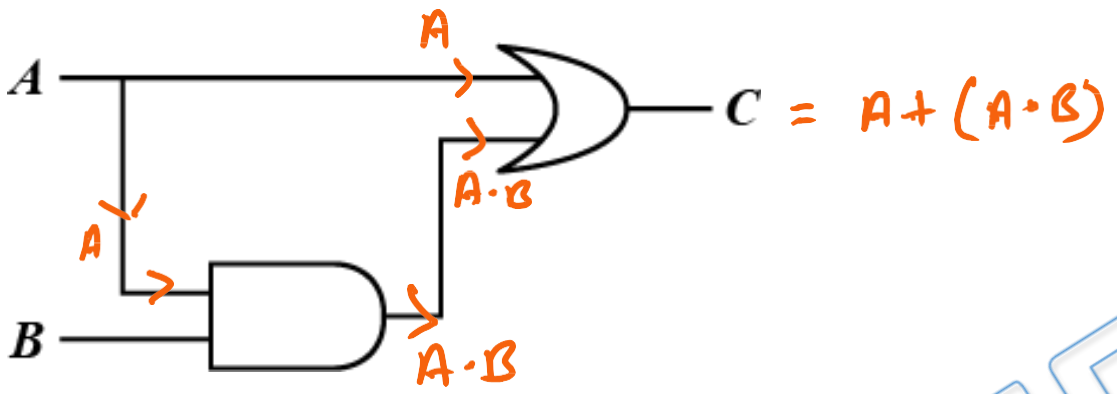
$1.0 = 0$

$0.1 = 0$

$1.1 = 1$

Ans. c

Solution: 11



So; $C = A + (A \cdot B)$

(a) $A=0;\ B=1$

$C = 0 + (0 \cdot 1)$

$\boxed{C=0}$

(b) $A=0;\ B=0$

$C = 0 + (0 \cdot 0)$

$\boxed{C=0}$

(c) $A=1;\ B=1$

$C = 1 + (1 \cdot 1)$

$\boxed{C=1}$

(d) $A=1;\ B=0$

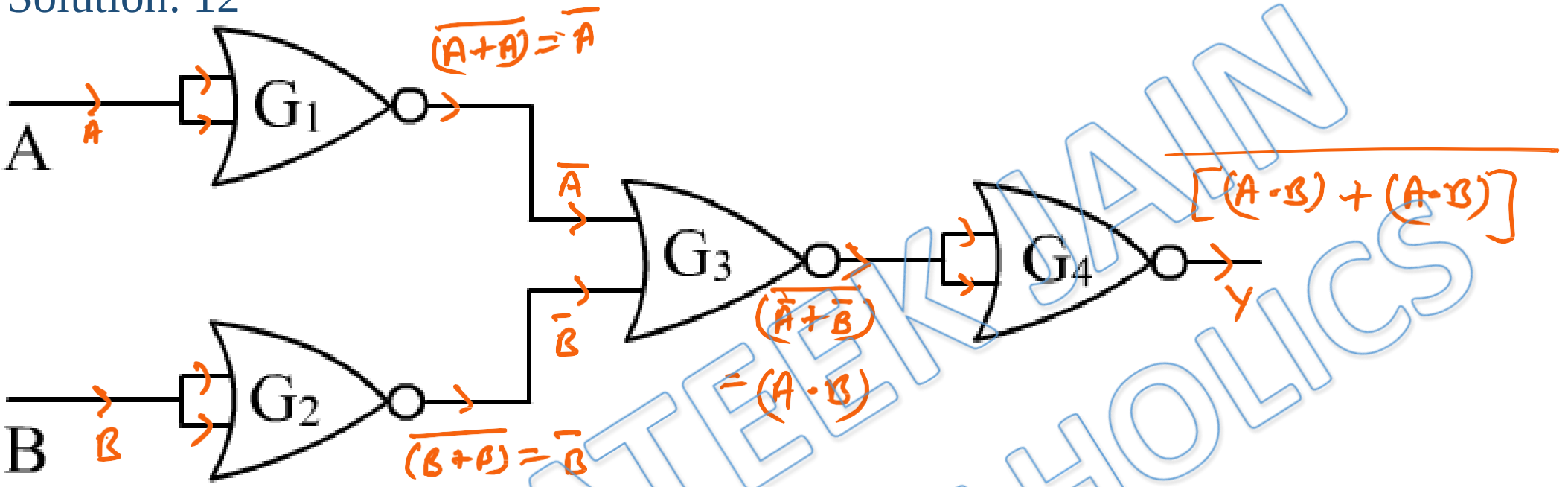
$C = 1 + (1 \cdot 0)$

$\boxed{C=1}$

So; (a) is not true

Ans. a

Solution: 12



So, output; $Y = \overline{[(A \cdot B) + (A \cdot B)]} = \overline{(A \cdot B)}$

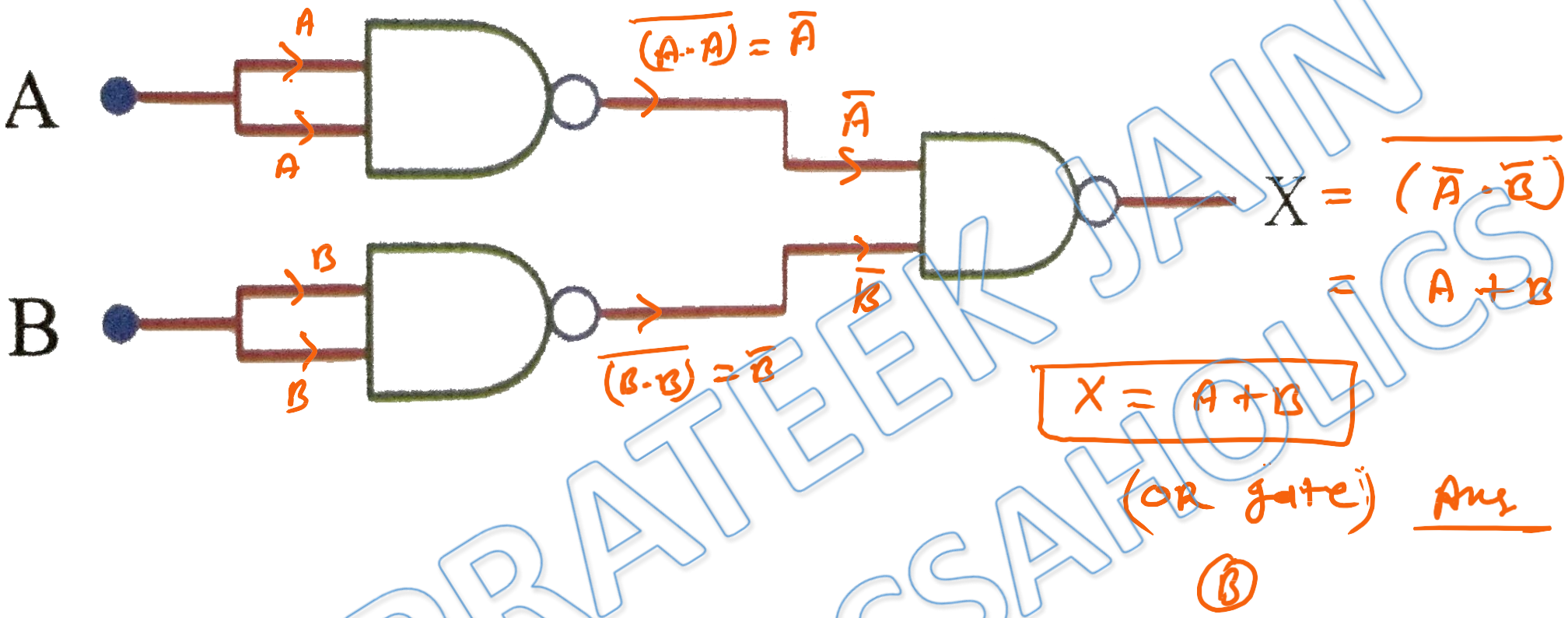
$$\boxed{Y = \overline{AB}}$$

this output is for NAND gate.

Ans.

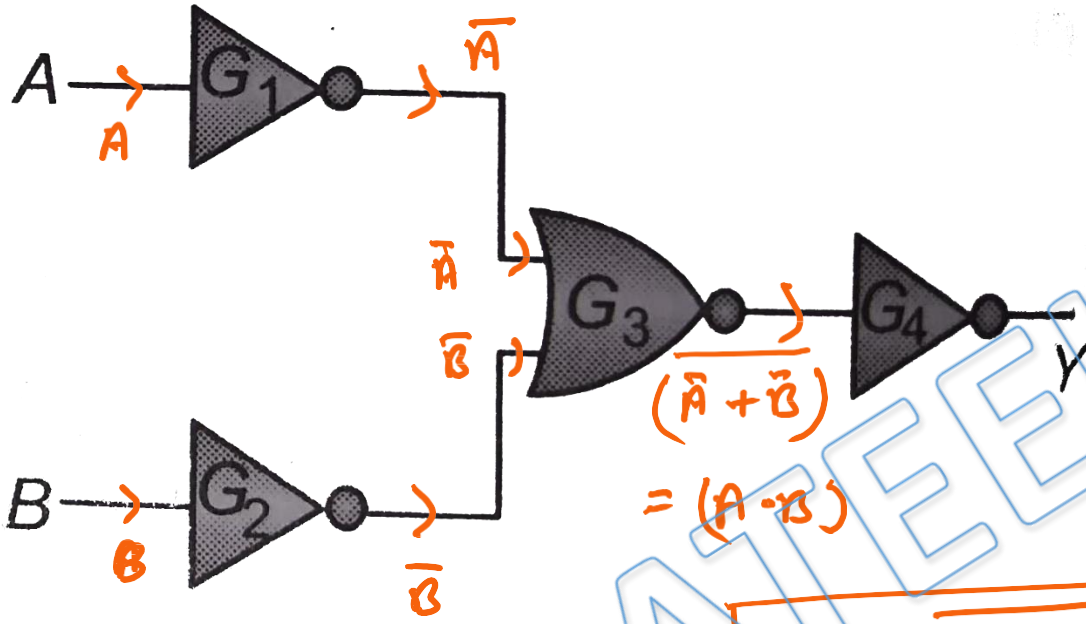
Ans. d

Solution: 13



Ans. b

Solution: 14



$\bar{A}$

$\bar{B}$

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

$= (A \cdot B)$

$Y = \overline{(A \cdot B)}$

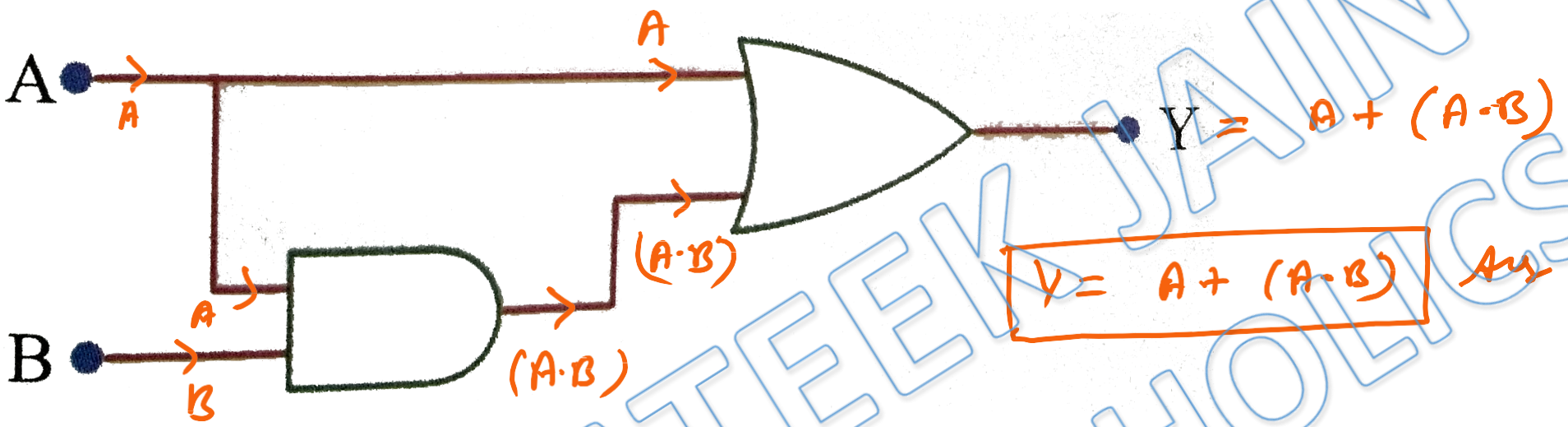
So, $\boxed{Y = \overline{(A \cdot B)}}$ output

NAND gate.

Ans

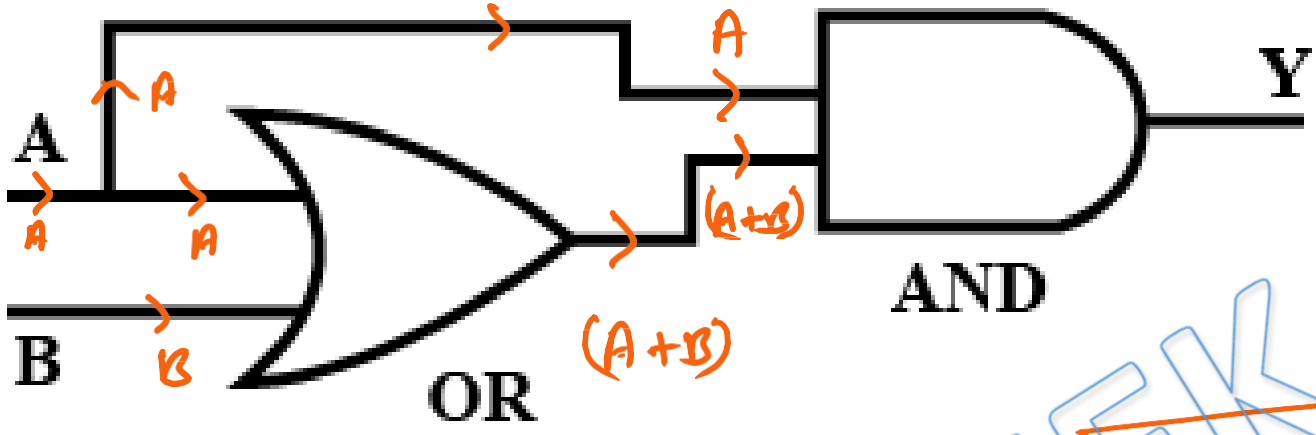
Ans. d

Solution: 15



Ans. a

Solution: 16



OUTPUT ; $Y = A \cdot (A+B)$

$Y = A \cdot A + A \cdot B$

$= A + A \cdot B$

$= A(1+B)$

$= A(1)$

$Y = A$ Ans

Ans. a

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