# Tutorial
# CSE-211

# Q1- Indicate which of the following logic gates can be used to realize all possible combinational Logic functions

(a) OR gates only

(b) NAND gates only

(c) NOR gates only

(d) both b and c

Answer

- OPTION- **D**
- NAND and NOR gates can be used to realize all possible combinational logic functions. That is why they are also called Universal gates.

# Q2- The output of a logic gate is ‘1’ when all its input are at logic 0.The gate is either

(a) NAND or an EX OR gate
(b) NOR or an EX-NOR gate
(c) an OR or an EX NOR gate
(d) an AND or an EX-OR gate

**Answer—-OPTION- (b)**

**If we see first gate of the given options then options (c) and (d) are ruled out as OR and AND gates give 0 output for zero inputs. Now see option (a) where NAND gate satisfies the condition but EX-OR gates does not as it gives 0 output for the same inputs. Option (b) is the correct choice where both gates satisfy the given condition.**

Q3—The Boolean function Y= AB + CD is to be realized using only 2 input NAND gates .The minimum number of gates required is

(a) 2
(b) 3
(c) 4
(d) 5

**Ans.** **(b)**

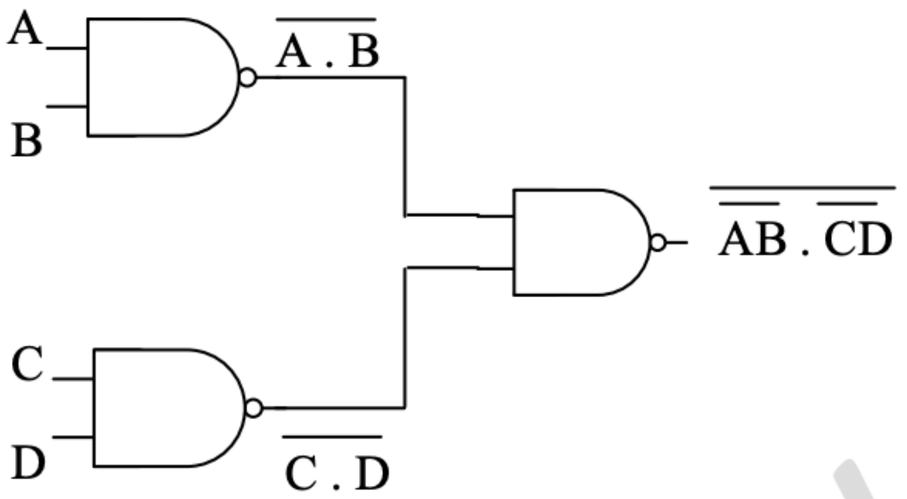
$$Y = AB + CD$$

**We double complement either side**

**i.e.** $\bar{\bar{Y}} = Y = \overline{\overline{AB + CD}}$

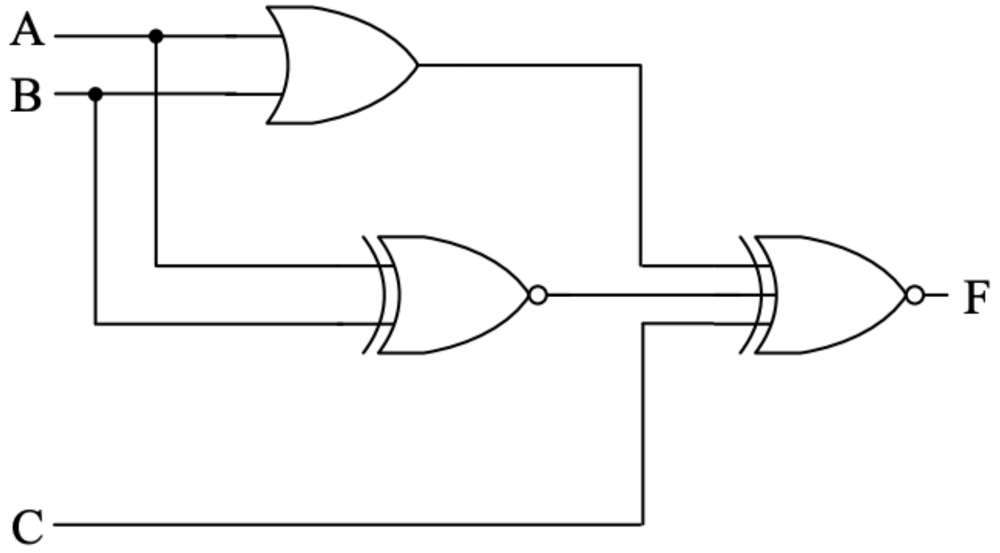
$$= \overline{\overline{AB}.\overline{CD}}$$

**Logic diagram for the expression is**




**So, requires three NAND gates**

**Q4.** For the output F to be 1 is the logic circuit shown, the input combination should be




(a) $A = 1, B = 1, C = 1$

(b) $A = 1, B = 0, C = 0$

(c) $A = 0, B = 1, C = 0$

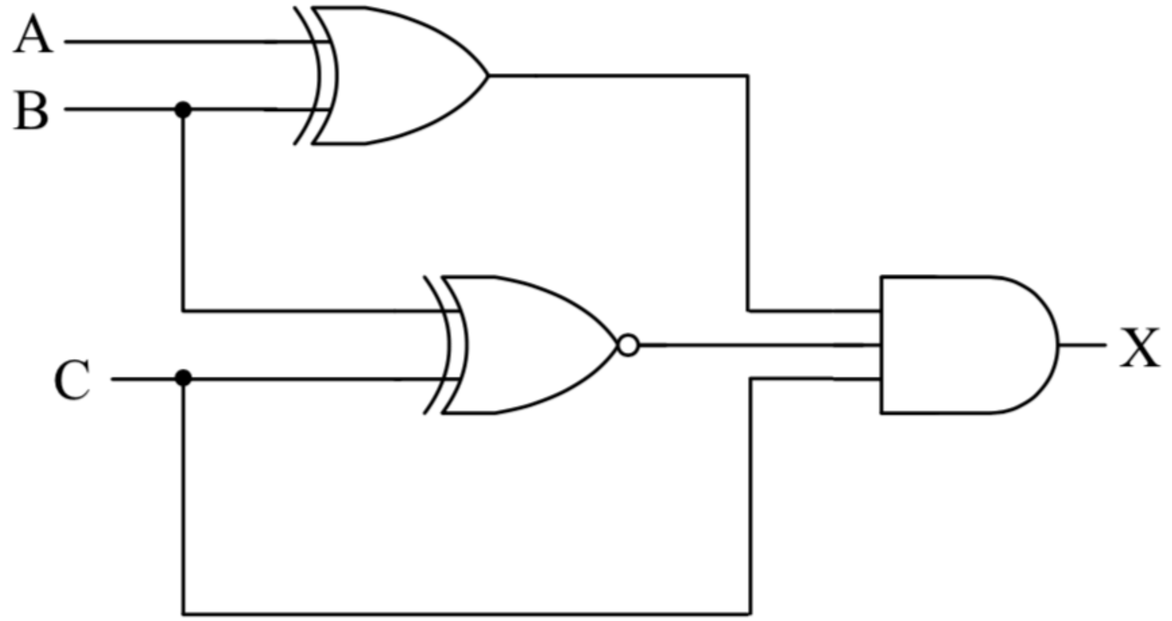
(d) $A = 0, B = 0, C = 1$

**[GATE 2010: 1 Mark]**

ANSWER-4—- (d)

The same inputs A and B are connected to EX-OR and EX-NOR gates. So the Output of them will be complement of each other i.e. 0,1 or 1,0 . For F to be 1, the inputs to EX-NOR should be even (even number of 1’s). For the input 1’s to be even numbers C has to be 1. There is only one option with C=1 i.e. option (d).

**Q-5** For the logic circuit shown in the figure, the required input condition (A,B,C) to make the output X =1 is




(a) 1, 0, 1
(b) 0, 0, 1
(c) 1, 1, 1
(d) 0, 1, 1

ANSWER-5— — —

As per the result the output X has to be 1, so all the inputs of AND gate should be 1.

i.e. C must be equal to 1.

One input to EX-NOR is 1(i.e. C)

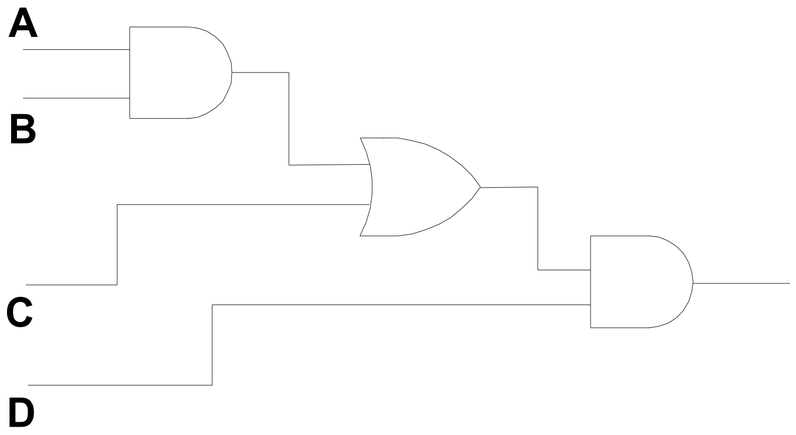
The other input should also be 1 to get the 1 output i.e. B=1

One of the input to EX-OR is 1(B=1) the other input has to be 0 to get 1 output at EX-OR Gate.

So, A=0 , B=1 And C=1

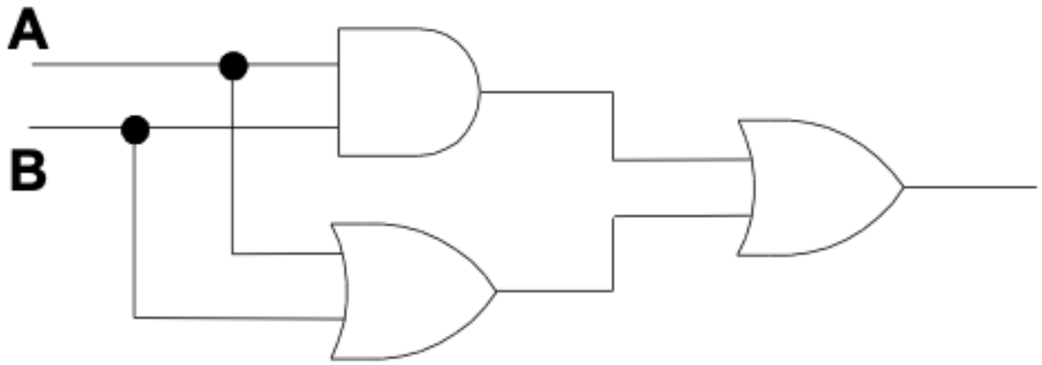
RIGHT Option (d)

Q-6- Draw a circuit diagram corresponding to the following Boolean expression:
(AB + C)D



- Q-7-

  Show the behavior of the following circuit with a truth table:



| A | B | AB | A+B | AB+(A+B) |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 1 |
| 1 | 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 |

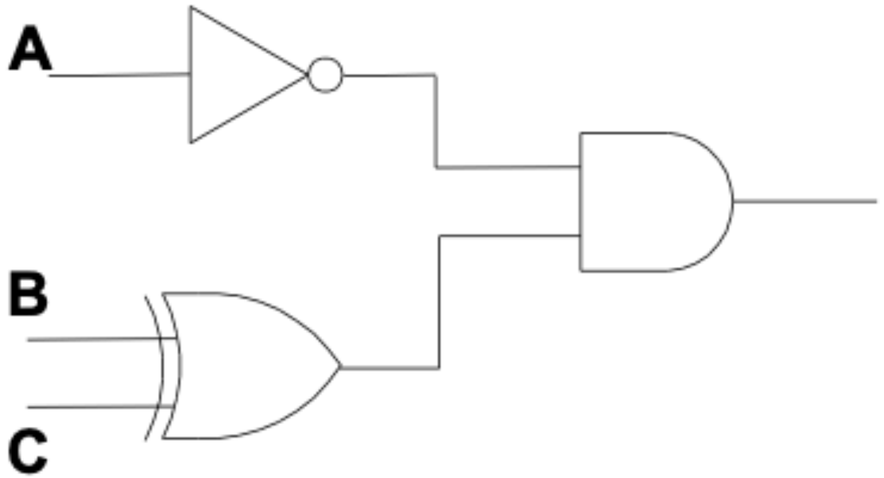
Q-8-
Electronic circuits that operate on one or more input signals to produce standard output _____
a) Series circuits
b) Parallel Circuits
c) Logic Signals
d) Logic Gates

ANSWER-8- OPTION- d

Explanation: The logic gates operate on one or more input signals to produce a standard output.
Logic gates give the output in the form of 0 and 1.
The Boolean algebra can be applied to the logic gates.

- **Q-9**

Show the behavior of the following circuit with a truth table:



| A | B | C | A’ | B⊕C | A’(B⊕C) |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | 0 | 0 |

Q-10-
The gate which is used to reverse the output obtained is _____
a) NOR
b) NAND
c) EXOR
d) NOT

Answer: d

Explanation: NOT gate is used to reverse the output from 0 to 1 and vice-versa.
The Boolean expression for NOT gate is Y=A'.
Therefore, it gives the complement of the result obtained.