

Quiz-4

(Logic and Boolean Expression)

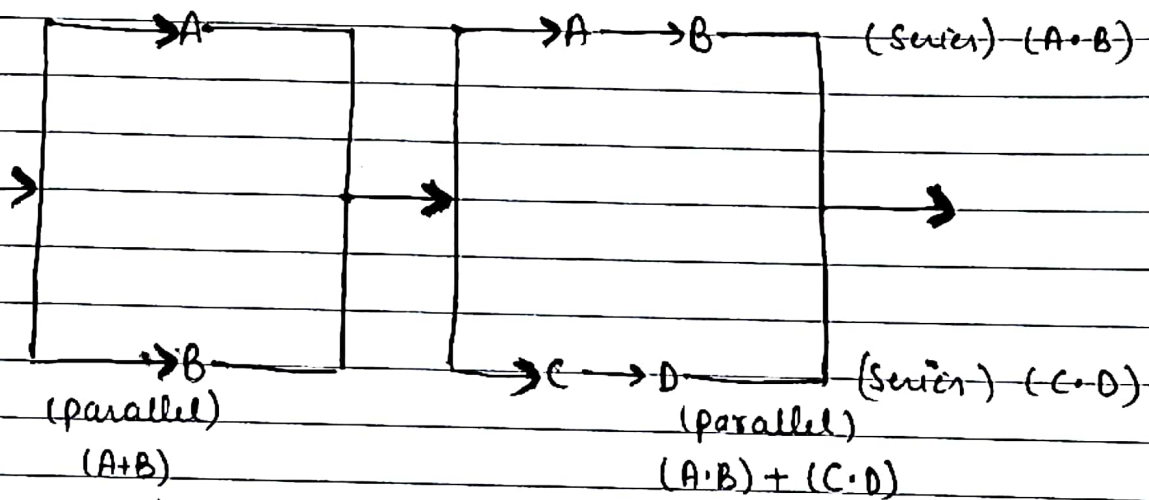
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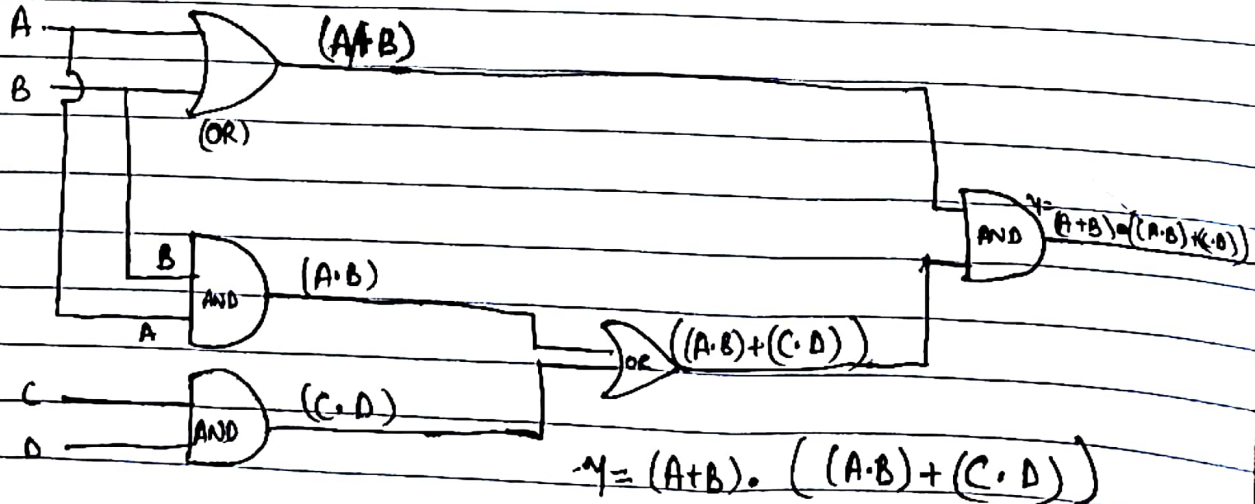
Ques-1 Write a Boolean Expression for the following network



Connected in Series :- $(A+B) \cdot ((A \cdot B) + (C \cdot D))$

Ans:- $(A+B) \cdot ((A \cdot B) + (C \cdot D))$

Logic Gate:-



Ques 2: List all the proper subsets of

$$D = \{\text{Mercury}, \text{Venus}, \text{Mars}\}$$

Proper subset $(2^n - 1)$ $n = 3$

Proper subsets of D is

~~xxx~~ $\phi, \{\text{Mercury}\}, \{\text{Venus}\}, \{\text{Mars}\}, \{\text{Mercury}, \text{Venus}\}, \{\text{Venus}, \text{Mars}\}, \{\text{Mercury}, \text{Mars}\}$

Ans: $\phi, \{\text{Mercury}\}, \{\text{Venus}\}, \{\text{Mars}\}, \{\text{Mercury}, \text{Venus}\}, \{\text{Venus}, \text{Mars}\}, \{\text{Mercury}, \text{Mars}\}$

Ques-3 Find the truth table for $\neg(p \wedge q) \vee \neg r$

p	q	r	$\neg r$	$p \wedge q$	$\neg(p \wedge q)$	$\neg(p \wedge q) \vee \neg r$
T	T	T	F	T	F	F
T	T	F	T	T	F	T
T	F	T	F	F	T	T
T	F	F	T	F	T	T
F	T	T	F	F	T	T
F	T	F	T	F	T	T
F	F	T	F	F	T	T
F	F	F	T	F	T	T

Ques 4 For $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$

$$A = \{4, 5, 6, 7\}$$

$$B = \{1, 3, 5\}$$

$$C = \{1, 8\}$$

Determine $\bar{B} \cup (A \cap \bar{C})$

Ans:-

$$\begin{aligned}\bar{B} &= U - B \\ &= \{1, 2, 3, 4, 5, 6, 7, 8\} - \{1, 3, 5\} \\ &= \{2, 4, 6, 7, 8\}\end{aligned}$$

$$\bar{B} = \{2, 4, 6, 7, 8\}$$

$$\begin{aligned}\bar{C} &= U - C \\ &= \{1, 2, 3, 4, 5, 6, 7, 8\} - \{1, 8\} \\ \bar{C} &= \{2, 3, 4, 5, 6, 7\}\end{aligned}$$

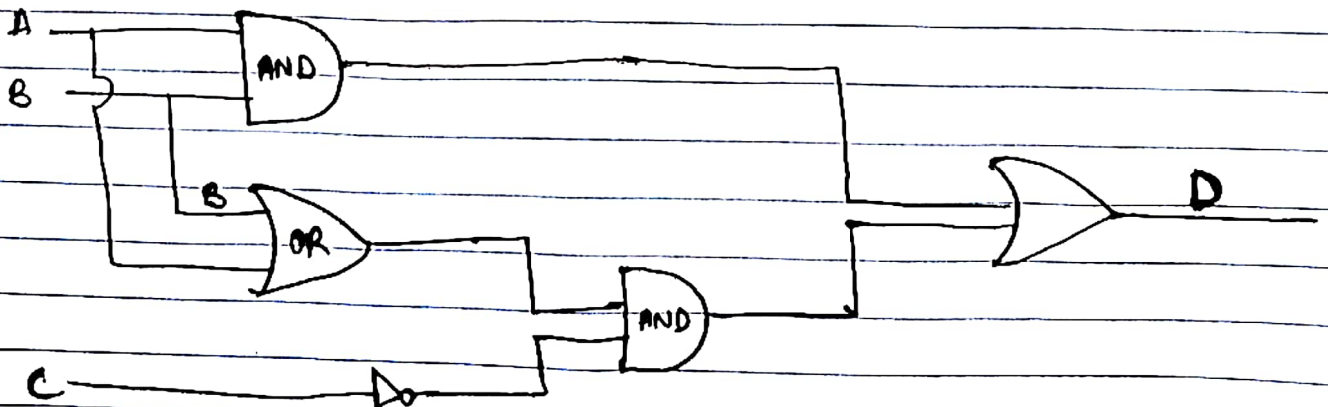
intersection) $(A \cap \bar{C}) = \{4, 5, 6, 7\} \cap \{2, 3, 4, 5, 6, 7\}$
 $= \{4, 5, 6, 7\}$

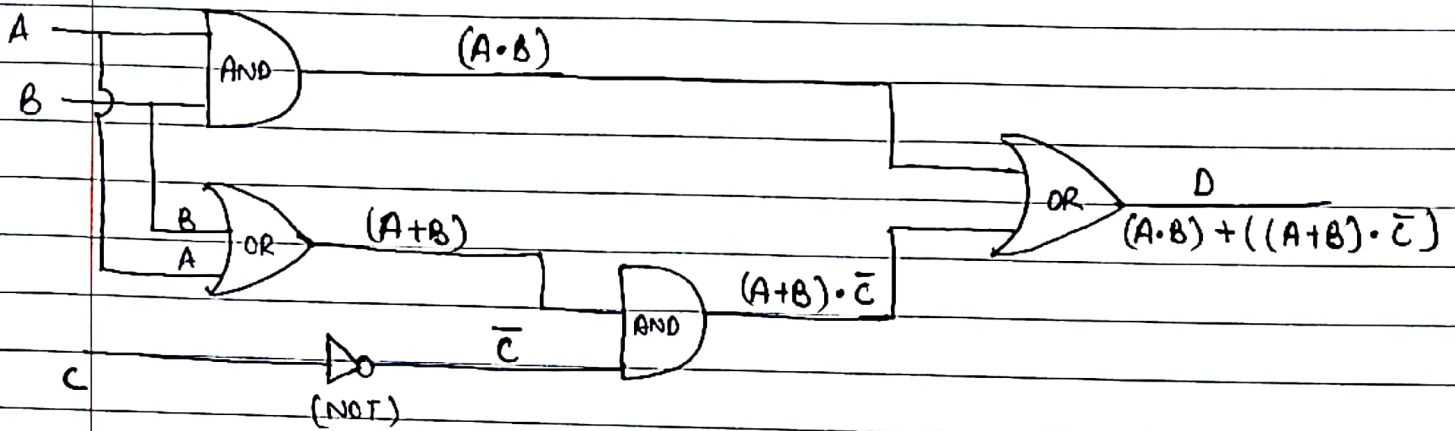
union) $\bar{B} \cup (A \cap \bar{C}) = \{2, 4, 6, 7, 8\} \cup \{4, 5, 6, 7\}$
 $= \{2, 4, 5, 6, 7, 8\}$

Ans:-

$$\bar{B} \cup (A \cap \bar{C}) = \{2, 4, 5, 6, 7, 8\}$$

Q-5 Write the Boolean Expression for this logic gate
 Eg:- In your Answer use not to describe the complement of a circuit.



Ans:-

$$A \text{ AND } B = A \cdot B$$

$$A \text{ OR } B = (A+B)$$

$$C \text{ NOT} = \bar{C}$$

$$\left[\begin{array}{l} A \text{ AND } B = A \cdot B \\ A \text{ OR } B = (A+B) \\ C \text{ NOT} = \bar{C} \end{array} \right] \rightarrow \text{AND } ((A+B) \cdot \bar{C}) \rightarrow \text{OR } (A \cdot B) + ((A+B) \cdot \bar{C})$$

$$D = (A \cdot B) + ((A+B) \cdot \text{NOT } C)$$

Ans:-

$$D = (A \cdot B) + ((A+B) \cdot \text{NOT } C)$$