Only four propositions, How many models | UGC NET

## UGC NET 2018 :

Consider the vocabulary with only four propositions $A, B, C$ and $D$. How many models are there for the following sentence?
( $\ulcorner\mathrm{A} \vee \vee \mathrm{B} \vee\ulcorner\mathrm{C} \vee\ulcorner\mathrm{D}$ )
A) 8
B) 7
C) 15
D) 16

## Solution:

We know there are total $2^{4}=16$ cases.
As shown in below truth table, it won't satisfy the condition when $A=B=C=D=0$.

| S.No |  |  | $C$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 0 | - | 0 | , | 0 |
| 2 |  | 0 | 0 | 1 | 1 |
| 3 | 0 | 0 | 1 | 0 | 1 |
| 4 |  | 0 | 1 | 1 | 1 |
| 5 |  | 1 | 0 | 0 | 1 |
| 6 |  | 1 | - | 1 | 1 |
| 7 | 0 | 1 | 1 | 0 | 1 |
| 8 |  | 1 | 1 | 1 | 1 |
| 9 |  | , | 0 | 0 | 1 |
| 10 |  | 0 | 0 | 1 | 1 |
| 11 |  | 0 | 1 | 0 | 1 |
| 12 |  | 0 | 1 | 1 |  |


| 13 | 1 | 1 | 0 | 0 | 1 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 14 | 1 | 1 | 0 | 1 | 1 |
| 15 | 1 | 1 | 1 | 0 | 1 |
| 16 | 1 | 1 | 1 | 1 | 1 |

So, from the given sentence false(0) occurs only if A, B, C and D are false(0) which occurs 1 time.

Required number of models $=16-1=15$.

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