BYJU'S EXAM PREP

Notes: Logical Consistency

Logical Consistency

➢ **Is logical consistency actually 'critical'?**

We all know that Logical Reasoning, especially the 'Critical Reasoning' part, is quite versatile and mesmerizingly composed of a number of varieties.

There is a very famous saying about these reasoning abilities: **'Keep your five senses in coordination; otherwise you will fall in a different category of reasoning.'**

The point to be noted is that we, as a candidate, while answering such reasoning questions with a thin line difference, must have good clarity of the varieties of questions that arise out of this concept.

In this note, we will be providing you with basic tips and concepts to solve logical consistency questions in the CLAT exam.

➢ Introduction:

Logical consistency is another branch of **Deductive Logic**. A set of sentences is said to be consistent **if and only if** there is at least one possible situation in which they are all true.

- If two sentences cannot be true at the same time, they are said to be contrary.
- **For example,** 'I have exactly 10 fingers' and 'I have exactly 9 fingers' are contrary (both statements cannot be true, but both could be false).

[IMPORTANT: Logical Consistency questions have the main statement; one needs to identify what type of statement it is and find out which states will follow logically.]

➢ **Some rules that must be kept in mind while solving Logical Consistency:**

- A set of statements is logically consistent if they can all be true at the same time.
- A set of statements is logically inconsistent if they cannot all be true at the same time.
- It may also be helpful to think of logical consistency as a set of beliefs that do not contradict each other (regardless of whether they are true).
- When evaluating logical consistency, assume the statements are true and think about whether they fit together like pieces of a puzzle.
- That is, consistency is about understanding the relationships between your beliefs, not proving a belief true.

➢ **Let's understand this concept with a real-life (may be hypothetical) situation:**

'Suppose your father promised you a new bike if you get good marks in your engineering. What if you don't get good marks?'

- Our analysis explores the possibility of your father buying a new bike for you, even if you don't get good marks! This type of reasoning is classified under a heading called 'Logical Consistency'.

➢ **Under the head of 'Logical Consistency', there are some varieties of questions that generally have relevance in competitive examinations. So, this is the actual thing we need to know as a candidate or student. Let's see some varieties:**

1. Structure 1: If ..., then....:

● Example: If it rains, it will be cloudy

If it rains, it will be cloudy.
x y

Let's explore the above statement in various cases:

- Case 1: If it rained, then we say that it should be cloudy. So, if x happened, then y should happen.

  $x \Rightarrow y$

- Case 2: There are no clouds, so there is no rain. $\sim y \Rightarrow \sim x$
- Case 3: 'It is not raining' is uncertain as there may or may not be clouds.
- Case 4: 'It is cloudy' is uncertain as it may or may not rain.

➔ So of the above 4 cases Case 1 and Case 2 hold good.

2. Structure 2: Only If

- Let us take an example: **Only If you work hard will you be successful.**

Write the above statement below.

- Whenever there is 'only if', make sure it is in the middle of the two given statements.

You will be successful only if you work hard.

x y

Now, to become successful, there is only one condition (to work hard). So, we say that if one has succeeded, it means he must have worked hard. So, $x \Rightarrow y$

- Also, you did not work hard means you didn't succeed. $\sim y \Rightarrow \sim x$

3. Structure 3: When/Whenever

- **When/Whenever is similar to Structure 1 (If, then). So, when x, then y**
- **So, the possible conclusions are:**

$x \Rightarrow y$

$\sim y \Rightarrow \sim x$

4. **Structure 4: Unless**

- **Unless means 'If not'.**

5. **Structure 5: Either/or**

- Unless you work hard, you fail: If you don't work hard, then you fail.
- Again, x ⇒ y and ~y ⇒ ~x are true.
- Take the proposition: Either I will drink Pepsi or I will eat a sandwich. Let 'I will drink Pepsi' be 'X' and 'I will eat a sandwich be 'Y'.

- **If I drank Pepsi, then one cannot say whether I ate a sandwich or not. But if I did not drink Pepsi, then one can say that I must have eaten a sandwich.**
- **So, the possible conclusions are as follows:**

~x ⇒ y

~y ⇒ x

6. **Structure 6: Negation**

- Negation basically resorts to challenging the validity of a statement and proving it false or invalid.
- So, in case 'If I drink tea, then I will take biscuits as well is the statement, its negation will be 'If I drink tea, I'll not take biscuits.'
- **So, the possible conclusions are as follows:**

If X, then Y => If X, then not Y

If only X, then Y => Not X, but Y

If X, then Y => No X or no Y

7. **Structure 7: If and only if**

- Here, the conclusion will only follow if the prerequisite condition is met.
- For example, one can be a mayor if and only if one wins the elections.
- So, the possible conclusions are as follows:

If X, then Y
If Y, then X

If not X, then not Y

If not Y, then not X

➢ Let's understand this concept more clearly with the help of some relevant examples:

Q1. Rishu is in the class when Vaishnavi is in the library.

1. Vaishnavi is in the library.
2. Rishu is in the park.
3. Vaishnavi is not in the library.
4. Rishu is in the class.

Mark your answer as:

1. **CA**
2. **AD**
3. **BC**
4. **BD**

Correct answer: (b)
Solution: First of all, we have to read the question carefully and find out the variety/type of Logical Consistency to which it belongs. Then we have to apply the reasoning accordingly. So, in this case, it belongs to the type 'When X, then Y'. So, when Vaishnavi is in the library, Rishu is in the class; or if Rishu is not in the class, then Vaishnavi is not in the library. So, AD is the correct answer and the correct logical sequence for this particular logical consistency.

Q2. My house has got a number.

1. If it is a multiple of 3, then it is in between 50 and 59.
2. If it is not a multiple of 4, then it is between 60 and 69.
3. If it is not a multiple of 6, then it is between 70 to 79.

What is my house number?

Mark your answer as:

1. 60
2. 48
3. 76
4. 72

Correct Answer: C

Solution: If the house number has to be from 50 to 59, then the 'if' conditions of the second and the third statements can't be true. So, it is a multiple of 4 and 6. Now, we know that if a number is a multiple of both 4 and 6, then it is a multiple of 12. But no multiple of 12 multiple exists between 50 and 59. So, the house number can't be between 50 to 59. If the house number has to be between 60 and 69, then the 'if' conditions of the first and the third statements can't be true. So, the number should not be a multiple of 3 but a multiple of 6. All multiples of 6 should be multiples of 3. So, no number exists in between 60 and 69. So, the house number should exist between 70 to 79. Then, it should not be a multiple of 3 but a multiple of 4. Between 70 to 79, 72 and 76 are multiples of 4, but only 76 is not a multiple of 3. So, the house number is 76.

➢ **Cause and effect:**

Example: The ground is wet if it rains.

- We now need to identify the 'cause and effect' in this sentence.

- The cause is 'It rains'.

- The effect is 'The ground is wet'.

- This is an 'If' statement.

Based on this, let us now understand how the 'effect' affects the 'cause' and vice versa:

(Should be read in this direction only)

Cause (if cause happens)	**Effect (the effect will happen subsequently)**
'If it rains'	**'the ground is wet'**
'If it doesn't rain'	**'the ground may be wet'**

Effect (if effect happens)	**Cause (cause will happen)**
The ground is wet.	**It may have rained.**
The ground is not wet.	**It didn't rain.**

➢ So, in the concluding line, we can say that only certainties should be taken into account while solving logic-related questions.

➢ Hence, we can summarise as follows:

- In an 'If' statement, if the 'cause' happens, the 'effect' will happen. If the 'effect' did not happen, the 'cause' will not happen.

BYJU'S EXAM PREP

Prepare for CLAT and Other Law Entrance Exams

- Live Classes by Top Faculty
- Comprehensive Study Material
- Daily Study Plan
- Latest Pattern Test Series
- Complete Doubt Resolution
- Regular Assessments with Report Card