Logical Consistency

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 explore possibilities 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 head called "Logical Consistency"

If ..., Then ....:

Let us take an example: **If it rains, It will be cloudy**

Let us explore the above statement in various cases

Case 1: It rained then we say, It should be cloudy. So If x happened then y should happen. **x ⇒ y**

Case 2: There are no clouds, So there is no rain. **~ y ⇒ ~ x**

Case 3: It is not raining. Uncertain. As there may be clouds or may not be.

Case 4: It is cloudy. Uncertain. As it may rain may not rain.

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

Other Structures:

Only If:

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

Write the above statement like below. whenever there is 'onlyif' make sure it is in the middle of the two given statements.

Now to become successful, there is only one condition. To work hard. So we say, If one is succeeded means he must have work hard. So **x ⇒ y**

Also you did not work hard means, you are not succeeded. **~ y ⇒ ~ x**

When / Whenever:

When / Whenever is same as If. When x then y.

So possible conclusions are

1. **x ⇒ y**

2. **~ y ⇒ ~ x**

Unless :

Unless means "If not"

Unless you work hard, you fail = If you don't work hard, then you fail.

Again **x ⇒ y** and **~ y ⇒ ~ x** are true

Either / or :

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'.

I drank Pepsi, then one cannot say whether I ate sandwich or not. But If did not drink Pepsi, then one can say that I must have eaten sandwich. So

Possible conclusions:

1. ~ x ⇒ y

2. ~ y ⇒ x

Solved Examples

1. Sam is either black or white.

A. Sam is not white B. Sam is white

C. Sam is black. D. Sam is not black.

a. CB b. BA

c. DB d. DC

Solution: We know that If not black then White or If not white then black. So AC or DB correct. Correct option C.

2. Rohit is in the class when Puneet is in the lab.

A. Puneet is in the lab.

B. Rohit is in the park.

C. Puneet is not in the lab.

D. Rohit is in the class.

a. CA b. AD

c. BC d. BD

Solution: When X then Y. So When puneet is in the lab, then Rohit is in the class or Rohit is not in the class then Puneet is not in the lab. So AD is correct.

3. You will add more value to the brand if strategic planning is done.

A. Stratigic planning was done.

B. More value was not added to the brand.

C. More value was added to the brand.

D. Stratigic planning was not done.

a. BD b. DB

c. BC d. DC

Solution: If strategic planning was done then you added more value to the brand or you did not add more value then Strategic planning was not done. So AC or BD correct. So choice A.

4. She sleeps only when her boss is away from the office.

A. The boss is away B. She did not sleep.

C. She slept. D. The boss ins in the office.

a. DB b. AB

c. DC d. BC

Solution: Only when X then Y means Y happen then X happens or its contra positive X did not happen then Y did not happen. So We say She slept means boss is away, or Boss is not away then She did not sleep.

Option A.

5. If Berty and Oly are selected in that order, Phil and Santhi cannot be selected.

A. Phil and Santhi are selected in that order.

B. Oly and Berty are selected in that order.

C. Berty and Oly are selected in that order.

D. Phil and Santhi are not selected.

a. BC b. CD

c. BD d. DB

Solution: this is called compound hypothetical. If A and B then not C and D, Then C and D then not A or not B.

Option B

Level 2

6. My house has got a number.

If it is a multiple of 3, then it is in between 50 and 59.

If it is not a multiple of 4, then it is in between 60 and 69

If it is not a multiple of 6, then it is in between 70 to 79

What is my house number?

Solution: If the house number has to be in 50 to 59, then "If "conditions 2nd and 3rd statements should not happen. i.e., 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 12 multiple exists between 50 to 59. So house number should not be in between 50 to 59

If the house number has to be in 60 to 69, then "if" conditions of 1st and 3rd statements should not happen. i.e., the number should not be a multiple of 3 but multiple of 6. All multiple of 6 should be multiples of 3. So no number exists in between 60 to 69

So the house number should exists between 70 to 79. Then It should not be a multiple of 3 but multiple of 4. Between 70 to 79, 72 and 76 are multiples of 4 but only 76 is not a multiple of 3. So my house number is 76