The forms highlighted in red *do not seem to be* equivalent of "if p then q". What follows is a brief justification of their equivalences.

q is necessary for p (a necessary condition for p is q)

This means that q must be true whenever *p* is true. However, it does not say anything about truth value of *q* when *p* is false. Hence, the statement is *false only* when *p is true* and *q is false*, but it is true otherwise. Thus, it is logically equivalent to p → q.

p only if q

Note that "p only if q" says that p cannot be true when q is not true. That is, the statement is *false only* in the case when *q is false* and *p is true*. When p is false, q may be either true or false, because the statement says nothing about the truth value of q in that case. Hence, this is logically equivalent to "if p then q".

q unless ¬ p

This means that q is true as long as ¬ p is false. Hence, the statement "q unless ¬ p" is false only when *p is true* and *q is false*, but it is true otherwise. Consequently, "q unless ¬ p" and p → q always have the same truth value.

Biconditionals

Let p and q be propositions. The biconditional statement p ↔ q is the proposition "p if and only if q" (abbreviated p iff q) The biconditional statement p ↔ q is true when p and q have the same truth values, and is false otherwise. Biconditional statements are also called *bi-implications*.

p ↔ q ≡ (p → q) ∧ (q → p)

p	q	p ↔ q
T	T	T
T	F	F
F	T	F
F	F	T

There are some other common ways to express p ↔ q: "p is necessary and sufficient for q" and "if p then q, and conversely"

Example

Let p: "You can take the flight" and q: "You buy a ticket." Then p ↔ q is the statement "You can take the flight if and only if you buy a ticket."
This statement is true if p and q are either both true or both false, that is, if you buy a ticket and can take the flight or if you do not buy a ticket and you cannot take the flight. It is false when p and q have opposite truth values, that is, when you do not buy a ticket, but you can take the flight (such as when you get a free trip) and when you buy a ticket and cannot take the flight (such as when the airline bumps you).

You should also note that

Propositions p and q are logically equivalent (i.e. p ≡ q) iff p ↔ q is a tautology.

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وہی جہاں ہے ترا جس کو تو کرے پیدا　　یہ سنگ و خشت نہیں جو تری نگاہ میں ہے
(اقبال)