Fallacies

$$P \rightarrow \theta \quad \therefore \theta \rightarrow P \quad \text{Converse Error}$$
$$P \rightarrow \theta \quad \therefore \neg P \rightarrow \neg \theta \quad \text{Inverse Error}$$

A **Fallacy** is an error in reasoning that results in an invalid argument.

Two types of fallacies are →

1. The fallacy of affirming the consequent.
   (or affirming the converse)

2. The fallacy of denying the hypothesis.
   (or assuming the Inverse)

Example 1

$$P \rightarrow q$$
$$\underline{q}$$
$$\therefore P$$

[Modus Ponens not applied here]

A| Sidharth solved this problem, then he obtained the answer 5.

Sidharth obtained the answer 5.

Therefore, Sidharth solved this problem correctly.

→ This argument is of the form :- $P \rightarrow q$ and q then P

Note: This argument is invalid because the conclusion can be false even though $P \rightarrow q$ and q are true

$((P \to q) \land q) \to p$ is not a Tautology.

This is termed as the

*) fallacy of affirming the consequent.

Example 2 : If two sides of a triangle are equal, then the opposite angles are equal.

Two sides of a triangle are not equal.

Therefore, the opposite angles are not equal.

To, find if the argument is valid,

Let p : Two sides of a triangle are equal

q : The opposite angles are equal

$[(P \to q) \land \lnot p] \to \lnot q$ is not a Tautology.

∴ The given argument is invalid

This is the fallacy of Denying the Hypothesis