Unit- 2

Argument:

It is an assertion that the given set of propositions $P_1, P_2 \cdots P_n$ Called premises yields another proposition Q Called Conclusion and is denoted by $P_1, P_2, P_3 \cdots P_n \vdash Q$

↓ notation of argument

VALID ARGUMENT

An argument $P_1, P_2 \cdots P_n$ is said to be Valid if Q is true whenever all the premises $P_1, P_2 \cdots P_n$ are all true. The argument is valid iff

$P_1 \wedge P_2 \wedge P_3 \cdots \wedge P_n \rightarrow Q$ is a Tautology

FALLACY

It is an argument which is not Valid.

Important Note:- Always write your premises in terms of P_1, P_2, P_3 and conclusion is Q not small q because P → antecedent, Q → Consequent

Statement

Qus 1

If I work hard, I shall get a job
I got a job, therefore
I worked hard

Solution

P: I work hard
Q: I get a Job

Premises P_1: $P \rightarrow Q$ according to first line
" P_2: Q " " second line
∴: P

$P \rightarrow Q, Q \vdash P$ notation of statement

now to check its validity we will write its argument

$P \rightarrow Q \wedge Q \rightarrow P$ Should be tautology

Q.2 find if the following argument is valid or not

If it rains, he will be sick
It did not rain
Conclusion He was not sick
P: It rains, Q: He is sick

$P_1 : P \to Q$

$P_2 : \sim P$

$Q : \sim Q$

$P \to Q, \sim P \vdash \sim Q$ notation of Statement

$P \to Q \wedge \sim P \to \sim Q$

P	Q	$P \to Q$	$\sim P$	$\sim Q$	$P \to Q \wedge \sim P$	$P \to Q \wedge \sim P \to \sim Q$
T	T	T	F	F	F	T
T	F	F	F	T	F	T
F	T	T	T	F	T	F
F	F	T	T	T	T	T

Since it is not a tautology, hence it is not a Valid argument

Q.3 If Ram works hard, he will Get a Job
Ram works hard therefore he will Get a Job → means Conclusion

Solution

P : Ram works hard
Q : He Get a Job

$P_1 : P \to Q$

$P_2 : P$

$Q : Q$

$P \to Q, P \vdash Q$

Now will check its validity

Validity

$(P \to Q) \wedge P \to Q$

Say A

P	Q	$P \to Q$	$P \to Q \wedge P$	$A \to Q$
T	T	T	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	T

Hence it is valid argument

Important

Note Kinds of Proposition

(1) Converse : The Converse of a given conditional is a new conditional formed by interchanging the antecedant and consequent

e.g if $P \to Q$

then Converse $Q \to P$

eg If 15 is an odd number then 3 is a factor of 15

Converse : If 3 is a factor of 15 then 15 is an odd number.

(2) Inverse

The inverse of the given conditional is a new conditional

whose antecedent is the negation of the original antecedent & whose consequent is the negation of the original consequent

If $P \rightarrow Q$

then $\sim P \rightarrow \sim Q$

e.g If it rains then I shall not go out

Inverse If it does not rain then I shall go out.

Contra-positive

The contrapositive of the given conditional is a new conditional whose antecendant is the negation of the original consequent & whose consequent is the negation of the original antecendent.

e.g $P \rightarrow Q$

Contrapositive $\sim Q \rightarrow \sim P$

e.g. If it rains then I shall not go out.

Contrapositive :- If I shall go out then it does not rain.