L1 18 Jan 2022

18 January 2022 10:32

Unit-1 Logic Calculus:-

Proposition or Statement:-

Is a declarative sentence which is either true or false but not both at the same time.

(a) Lpu is in punjab — Proposition (True)

(b) $1+1=4$ — Proposition (False)

(c) $9<6$ — Proposition (False)

(d) Do your homework — (Not a proposition)

(e) Where are you going? — (Not a proposition)

(f) $x+2=11$ — (Not a proposition)

$x=5$, $x+2=11$

$x=5$: $5+2 \neq 11$

$x=9$: $9+2=11$

$x+3=5$ → Not a proposition

$x=2$, $x+3=5$

$x=2$ is solution of $x^2=4$

Yes it is a proposition

Q3. Which of the following statement is a proposition?

(a) Get me a glass of milkshake

(b) God bless you!

(c) What is the time now?

(d) The only odd prime number is 2

Types of propositions

(1) Primitive propositions

(2) Compound propositions

↓ which can be broken down

① Primitive propositions
↓
which cannot be broken down into smaller subpropositions

② Compound propositions
↓
is a proposition which can be broken down into simple subpropositions

ⓐ Lpu is in punjab. (primitive)

ⓑ Nikita is intelligent and she studies everyday.
↓ Compound proposition

ⓒ If you work hard then you will pass the course MTH403.
↓ Compound proposition

ⓓ 1+1=2 and 2+3=6

ⓔ Roses are red → Primitive proposition

Connective

① and → Conjunction
② OR → Disjunction
③ Not → Negation
④ If then → Conditional proposition
⑤ If and only if → Biconditional

Basic Logical Operations

① Conjunction :- (and, ∧, X)

Any two propositions can be combined by the word "and" to form a compound proposition is called "Conjunction"

$P \wedge q$

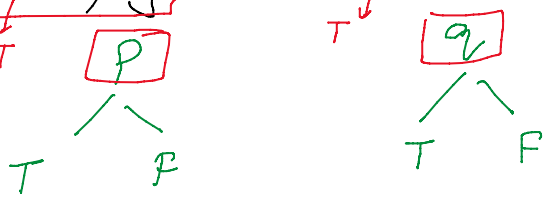
P :- Lpu is in punjab q :- 1+1=2

p:- Lpu is in punjab

q:- 1+1=2

p∧q:- Lpu is in punjab and 1+1=2.

T T
T F
F T
F F



② × ② = 4

p, q, s

2 × 2 × 2 = 8

Truth table for Conjunction

p	q	p∧q
T	T	T
T	F	F
F	T	F
F	F	F

T → 1
F → 0

② Disjunction :- (or, ∨, +)

Any two propositions can be combined by the word "or" to form a compound proposition called the disjunction.

$p \vee q$

p∨q:- Lpu is in punjab or 1+1=2

Truth table for Disjunction

p	q	p∨q
T	T	T
T	F	T
F	T	T
F	F	F

T → 1
F → 0

Ex:-

(a) 4+5=9 and 1+2=4

(a) $\underbrace{4+5=9}_{\downarrow T}$ and $\underbrace{1+2=4}_{\downarrow F}$

$T \wedge F = F$