

Practice Questions

Lecture No. 1

Q1: Separate the statements (Propositions) and sentences from the following:

- a) $7 + 5 = 15$ statement
- b) $7 + 5 = 12$ statement
- c) The sky is blue. statement
- d) He is a poor man. sentences
- e) Zaid is a poor man. statement
- f) $x \geq 5$ sentences
- g) Given $x = 9$, then x is greater than 5. statement
- h) Open the book. sentences
- i) Logic is not difficult. statement
- j) Is it hot today? sentences

Q2: Let $p =$ I am healthy, $q =$ I am ill.

Then translate the following into word statements:

- a) $\sim p$ I am not healthy.
- b) $\sim q$ I am not ill.
- c) $p \vee q$ I am healthy or I am ill.

d) $\sim p \wedge q$ I am not healthy and I am ill.

e) $\sim p \vee q$ I am not healthy or I am ill.

f) $p \wedge \sim q$ I am healthy and I am not ill.

Q3: When is $p \wedge q$ True? P is true and q is true

Q4: When is $p \wedge q$ False? At least one of the P and q are false

Q5: When is $p \vee q$ True? P and q at least one is true

Q6: When is $p \vee q$ False? P and q both are false.

Q7: Write the conjunction of p and q in symbolic form. $p \wedge q$

Q8: Write the disjunction of p and q in symbolic form. $p \vee q$

Q9: Let p = Saleem is a student, q = Saleem is hardworking.

Then translate the following into symbolic statements:

- a) Saleem is NOT a student. $\sim p$
- b) Saleem is NOT hardworking. $\sim q$
- c) Saleem is a student AND Saleem is hardworking $p \wedge q$
- d) Saleem is a student AND Saleem is NOT hardworking $p \wedge \sim q$
- e) Saleem is NOT a student OR Saleem is hardworking $\sim p \vee q$
- f) Saleem is NOT a student AND Saleem is NOT hardworking $\sim p \wedge \sim q$

Practice Questions

Lecture No. 2

Q1: Construct a truth table for $\sim(\sim p) \wedge q$

p	q	$\sim p$	$\sim(\sim p)$	$\sim(\sim p) \wedge q$
T	T	F	T	T
T	F	F	T	F
F	T	T	F	F
F	F	T	F	F

Q2: Show that $\sim(\sim p) \wedge p \equiv p$

P	$\sim P$	$\sim(\sim P)$	$\sim(\sim P) \wedge P$
T	F	T	T
F	T	F	F

Q3: Write the negation of the statement:

The sea is near OR the sky is far.

P=Sea is near

Q= the sky is far

$P \vee Q$

Negation is

$\sim(P \vee Q) = \sim P \wedge \sim Q$

The sea is not near AND the sky is not far.

Q4: Write the negation of the statement:

I live in Pakistan AND I am a teacher.

I do not live in Pakistan OR I am not a teacher

Q5: Write the statement in the symbolic form:

It is NOT that I read the useless books AND I waste my time.

Let P = I read useless books, Q = I waste my time.

So answer is

$\sim(P \wedge Q)$

$\sim(p \wedge q)$

Q6: Write a statement in symbols, which is a tautology.

$\sim p \vee p$

Q7: Write the statement in the symbolic form:

It is NOT that Zaid is NOT an obedient boy.

Let P = zahid is obedient boy

$\sim(\sim p)$

Q8: Write the statement in the symbolic form:

It is NOT that Arslan plays football AND Aslam plays tennis.

P= Arsalan plays Football Q = Aslam plays Football

$\sim(P \wedge Q)$