

NAMA ANGGOTA KELOMPOK :

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1. if(if q then not p) then (not q and p) else not ((p or s) if and only if (if r then q))
if($q \rightarrow \sim p$) then ($\sim q \wedge p$) else $\sim ((p \vee s) \leftrightarrow (r \rightarrow q))$

	p	q	r	s	$\sim p$	$\sim q$	$q \rightarrow \sim p$	$\sim q \wedge p$	$p \vee s$	$r \rightarrow q$	$(p \vee s) \leftrightarrow (r \rightarrow q)$	$\sim ((p \vee s) \leftrightarrow (r \rightarrow q))$	if($q \rightarrow \sim p$) then ($\sim q \wedge p$) else $\sim ((p \vee s) \leftrightarrow (r \rightarrow q))$
a.	T	T	T	T	F	F	F	F	T	T	T	F	F
b.	F	F	F	F	T	T	T	F	F	T	F	T	F
c.	T	T	F	F	F	F	F	F	T	T	T	F	F
d.	F	F	T	T	T	T	T	F	T	F	F	T	F

2. Dengan menggunakan tabel kebenaran (truth value), tentukan nilai kebenaran dari kalimat logika berikut:
- a. (p and (if r then s)) if and only if ((if r then s) and p)

$(p \wedge (r \rightarrow s)) \leftrightarrow ((r \rightarrow s) \wedge p)$

p	r	s	$r \rightarrow s$	$p \wedge (r \rightarrow s)$	$(r \rightarrow s) \wedge p$	$(p \wedge (r \rightarrow s)) \leftrightarrow ((r \rightarrow s) \wedge p)$
T	T	T	T	T	T	T
T	T	F	F	F	F	T
T	F	T	T	T	T	T
T	F	F	T	T	T	T
F	T	T	T	F	F	T
F	T	F	F	F	F	T
F	F	T	T	F	F	T
F	F	F	T	F	F	T

b. (if not p then not s) or ((if q then s) and p)

$(\sim p \rightarrow \sim s) \vee ((q \rightarrow s) \wedge p)$

p	q	s	$\sim p$	$\sim s$	$\sim p \rightarrow \sim s$	$q \rightarrow s$	$(q \rightarrow s) \wedge p$	$(\sim p \rightarrow \sim s) \vee ((q \rightarrow s) \wedge p)$
T	T	T	F	F	T	T	T	T
T	T	F	F	T	T	F	F	T
T	F	T	F	F	T	T	T	T
T	F	F	F	T	T	T	T	T
F	T	T	T	F	F	T	F	F
F	T	F	T	T	T	F	F	T
F	F	T	T	F	F	T	F	F
F	F	F	T	T	T	T	F	T

3. Dengan mengasumsikan p dan r benar serta q dan s salah tentukan nilai kebenaran dari setiap kalimat logika (sentences), berikut

a. (p and (if r then s)) if and only if ((if r then s) and p)

$(p \wedge (r \rightarrow s)) \leftrightarrow ((r \rightarrow s) \wedge p)$

p	q	r	s	$r \rightarrow s$	$p \wedge (r \rightarrow s)$	$(r \rightarrow s) \wedge p$	$(p \wedge (r \rightarrow s)) \leftrightarrow ((r \rightarrow s) \wedge p)$
T	F	T	F	F	F	F	T

b. (if not p then not s) or ((if q then s) and p)

$(\sim p \rightarrow \sim s) \vee ((q \rightarrow s) \wedge p)$

p	q	r	s	$\sim p$	$\sim s$	$\sim p \rightarrow \sim s$	$q \rightarrow s$	$(q \rightarrow s) \wedge p$	$(\sim p \rightarrow \sim s) \vee ((q \rightarrow s) \wedge p)$
T	F	T	F	F	T	T	T	T	T

c. ((p or q) and not r) if and only if ((if p then r) and (if q then r)

$((p \vee q) \wedge \sim r) \leftrightarrow ((p \rightarrow r) \wedge (q \rightarrow r))$

p	q	r	s	$\sim r$	$p \vee q$	$(p \vee q) \wedge \sim r$	$p \rightarrow r$	$q \rightarrow r$	$(p \rightarrow r) \wedge (q \rightarrow r)$	$((p \vee q) \wedge \sim r) \leftrightarrow ((p \rightarrow r) \wedge (q \rightarrow r))$
T	F	T	F	F	T	F	T	T	T	F

- d. if ((if not q then p) or not q) then (p if and only if q) else not (r and q)
 If $((\sim q \rightarrow p) \vee \sim q)$ then $(p \leftrightarrow q)$ else $\sim (r \wedge q)$

p	q	r	s	$\sim q$	$\sim q \rightarrow p$	$(\sim q \rightarrow p) \vee \sim q$	$p \leftrightarrow q$	$r \wedge q$	$\sim (r \wedge q)$	If $((\sim q \rightarrow p) \vee \sim q)$ then $(p \leftrightarrow q)$ else $\sim (r \wedge q)$
T	F	T	F	T	T	T	F	F	T	F

4. Tentukan, apakah pasangan-pasangan kalimat berikut ekuivalen:
 a. $((\text{not } p \text{ or } q) \text{ and } (p \text{ or not } r)) \text{ and } (p \text{ or not } q)$ dengan not $(p \text{ or } r)$
 $((\sim p \vee q) \wedge (p \vee \sim r)) \wedge (p \vee \sim q)$ dengan $\sim (p \vee r)$

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

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- b. $(r \vee p) \wedge ((\sim r \vee (\sim r \vee (p \wedge q))) \wedge (r \vee q))$ dengan p and q
 $(r \vee p) \wedge ((\sim r \vee (\sim r \vee (p \wedge q))) \wedge (r \vee q))$ dengan $(p \wedge q)$

p	q	r	~r	r ∨ p	p ∧ q	~r ∨ (p ∧ q)	~r ∨ (~r ∨ (p ∧ q))	r ∨ q	(~r ∨ (~r ∨ (p ∧ q))) ∧ (r ∨ q)	(r ∨ p) ∧ ((~r ∨ (~r ∨ (p ∧ q))) ∧ (r ∨ q))
T	T	T	F	T	T	T	T	T	T	T
T	T	F	T	T	T	T	T	T	T	T
T	F	T	F	T	F	F	F	T	F	F
T	F	F	T	T	F	T	T	F	F	F
F	T	T	F	T	F	F	F	T	F	F
F	T	F	T	F	F	T	T	T	T	F
F	F	T	F	T	F	F	F	T	F	F
F	F	F	T	F	F	T	T	F	F	F

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- c. $(p \vee q) \wedge ((\sim p \wedge (\sim p \wedge q)))$ dengan not p and q
 $(p \vee q) \wedge ((\sim p \wedge (\sim p \wedge q)))$ dengan $(\sim p \wedge q)$

p	q	r	~p	p ∨ q	~p ∧ q	~p ∧ (~p ∧ q)	(p ∨ q) ∧ ((~p ∧ (~p ∧ q)))
T	T	T	F	T	F	F	F
T	T	F	F	T	F	F	F
T	F	T	F	T	F	F	F
T	F	F	F	T	F	F	F
F	T	T	T	T	T	T	T
F	T	F	T	T	T	T	T
F	F	T	T	F	F	F	F
F	F	F	T	F	F	F	F

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