

Ques No. 02

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① Identity law

$$P \vee F \equiv P$$

$$P \wedge T \equiv P$$

P	F	P	T
T	T	T	T
F	T	F	T

P	F	P	F
T	F	T	F
F	F	F	F

② Dominance law

$$P \vee T \equiv T$$

$$P \wedge F \equiv F$$

P	T	P	T
T	T	T	T
F	T	F	T

P	F	P	F
T	F	T	F
F	F	F	F

③ Idempotent law

$$P \vee P \equiv P$$

$$P \wedge P \equiv P$$

P	P	P	P
T	T	T	T
F	F	F	F

P	P	P	P
T	T	T	T
F	F	F	F

④ Double negation

$$\neg(\neg P) \equiv P$$

P	$\neg P$	$\neg(\neg P)$
T	F	T
F	T	F

⑤ Commutative laws

$$P \vee Q \equiv Q \vee P$$

$$P \wedge Q \equiv Q \wedge P$$

P	Q	P	Q
T	T	T	T
T	F	T	F
F	T	F	T
F	F	F	F

P	Q	P	Q
T	F	T	F
T	T	T	T
F	T	F	T
F	F	F	F

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## ⑥ Associative Law

$$p \vee (q \wedge r) \equiv (p \vee q) \wedge r$$

$$p \wedge (q \vee r) \equiv (p \wedge q) \vee r$$

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

## ⑦ Distributive Law

$$(p \vee q) \wedge (p \vee r) \equiv p \vee (q \wedge r)$$

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

$$(p \wedge q) \vee (p \wedge r) \equiv p \wedge (q \vee r)$$

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

Infinity  
Notes



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## ⑧ Demorgan's Law:

$$\neg(P \wedge Q) \equiv \neg P \vee \neg Q$$

P	Q	$\neg P$	$\neg Q$	$P \wedge Q$	$\neg(P \wedge Q)$	$\neg P \vee \neg Q$
T	T	F	F	T	F	F
T	F	F	T	F	T	T
F	T	T	F	F	T	T
F	F	T	T	F	T	T

$$\neg(P \vee Q) \equiv \neg P \wedge \neg Q$$

P	Q	$\neg P$	$\neg Q$	$P \vee Q$	$\neg(P \vee Q)$	$\neg P \wedge \neg Q$
T	T	F	F	T	F	F
T	F	F	T	T	F	F
F	T	T	F	T	F	F
F	F	T	T	F	T	T

## ⑨ Absorption Law:

$$P \vee (P \wedge Q) \equiv P$$

P	Q	$P \wedge Q$	$P \vee (P \wedge Q)$
T	T	T	T
T	F	F	T
F	T	F	F
F	F	F	F

$$P \wedge (P \vee Q) \equiv P$$

P	Q	$P \vee Q$	$P \wedge (P \vee Q)$
T	T	T	T
T	F	T	T
F	T	T	F
F	F	F	F