Answers to graders' quiz 1

جواب کوئیز نیمسال /

① _____

$$[(\bar{p} \wedge q) \vee (\bar{p} \wedge \bar{q})] \vee (p \wedge q) \equiv$$

$$(\bar{p} \wedge q) \wedge (\bar{p} \wedge \bar{q}) \vee (p \wedge q) \equiv$$

$$(p \vee \bar{q}) \wedge (p \vee q) \vee (p \wedge q) \equiv$$

$$p \vee (q \wedge \bar{q}) \vee (p \wedge q) \equiv p \vee (p \wedge q) \overset{\text{قانون}}{\underset{\text{جذب}}{\equiv}} p$$

$$p \vee F \equiv p$$

②

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

$$\equiv p \vee F \equiv p$$

③ $p \vee (p \wedge q) \equiv p$

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

$$\equiv p \wedge T \equiv p$$

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

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

$$(p \vee q) \wedge [r \vee (\sim p \wedge \sim q)] \rightarrow r$$

$$(p \vee q) \wedge [r \vee \sim (p \vee q)] \rightarrow r$$

$$[r \wedge (p \vee q)] \vee [\underbrace{(p \vee q) \wedge \sim (p \vee q)}_{F}]$$

$$\underbrace{[r \wedge (p \vee q)] \vee F}_{r \wedge (p \vee q)} \text{ (crossed out) } \rightarrow r$$

$$\sim [r \wedge (p \vee q)] \vee r \equiv \sim r \vee \sim (p \vee q) \vee r$$

$$\equiv \underbrace{(\sim r \vee r)}_{T} \vee \sim (p \vee q) \equiv \sim (p \vee q) \vee T$$

$$\equiv \boxed{T}$$