CS & IT ENGINEERING

Mathematical Logic

DPP 05

Discussion Notes

[MCQ]

2. Consider following two First Order Logic Statements:

S_1: $[\forall x(\sim P(x) \vee Q(x))] \rightarrow [\forall x\, P(x)] \rightarrow [\forall x\, Q(x)]$ (valid)

S_2: $[\exists x\, P(x)] \rightarrow [\exists x\, Q(x)] \rightarrow [\exists x\, (P(x) \rightarrow Q(x))]$ (Invalid)

Which of the following is valid?

(a) S_1 only (valid)

(b) S_2 only

(c) Both S_1 and S_2

(d) Neither S_1 nor S_2

$\forall x [\neg P(x) \vee Q(x)] \rightarrow \forall x P(x) \rightarrow \forall x Q(x)$

$\forall x (P(x) \rightarrow Q(x)) \rightarrow (\forall x P(x) \rightarrow \forall x Q(x))$

[MSQ]

3. $P(y) = \sqrt{y}$ is real in the domain of Z+ , then which of the following is / are correct?

(a) $\forall y\, P(y)$ ✓

(b) $\exists y\, P(y)$ ✓

(c) $\forall y \sim P(y)$ ✗

(d) $\exists y \sim P(y)$ ✗

$P(y): \sqrt{y}$ —— D: Z^+

[MCQ]

4. Which of the following is not valid logical expression?

(a) $\forall x\,[P(x) \rightarrow Q(x)] \rightarrow [\forall x\,P(x)] \rightarrow [\forall x\,Q(x)]$

(b) $\forall x\,[P(x) \vee Q(x)] \rightarrow [\forall x\,P(x)] \vee [\forall x\,Q(x)]$

(c) $\exists x\,[P(x) \wedge Q(x)] \rightarrow [\exists x\,P(x)] \wedge [\exists x\,Q(x)]$

(d) $\forall x\,[P(x) \leftrightarrow Q(x)] \rightarrow [\forall x\,P(x)] \leftrightarrow [\forall x\,Q(x)]$

[MCQ]

5. Consider following logical expressions:

I: $\forall y[P(y) \rightarrow Q] \leftrightarrow [\forall y\, P(y)] \rightarrow Q$ (Invalid)

II: $\exists y[P(y) \rightarrow Q] \rightarrow [\exists y\, P(y)] \rightarrow Q$ $\quad Q = F$

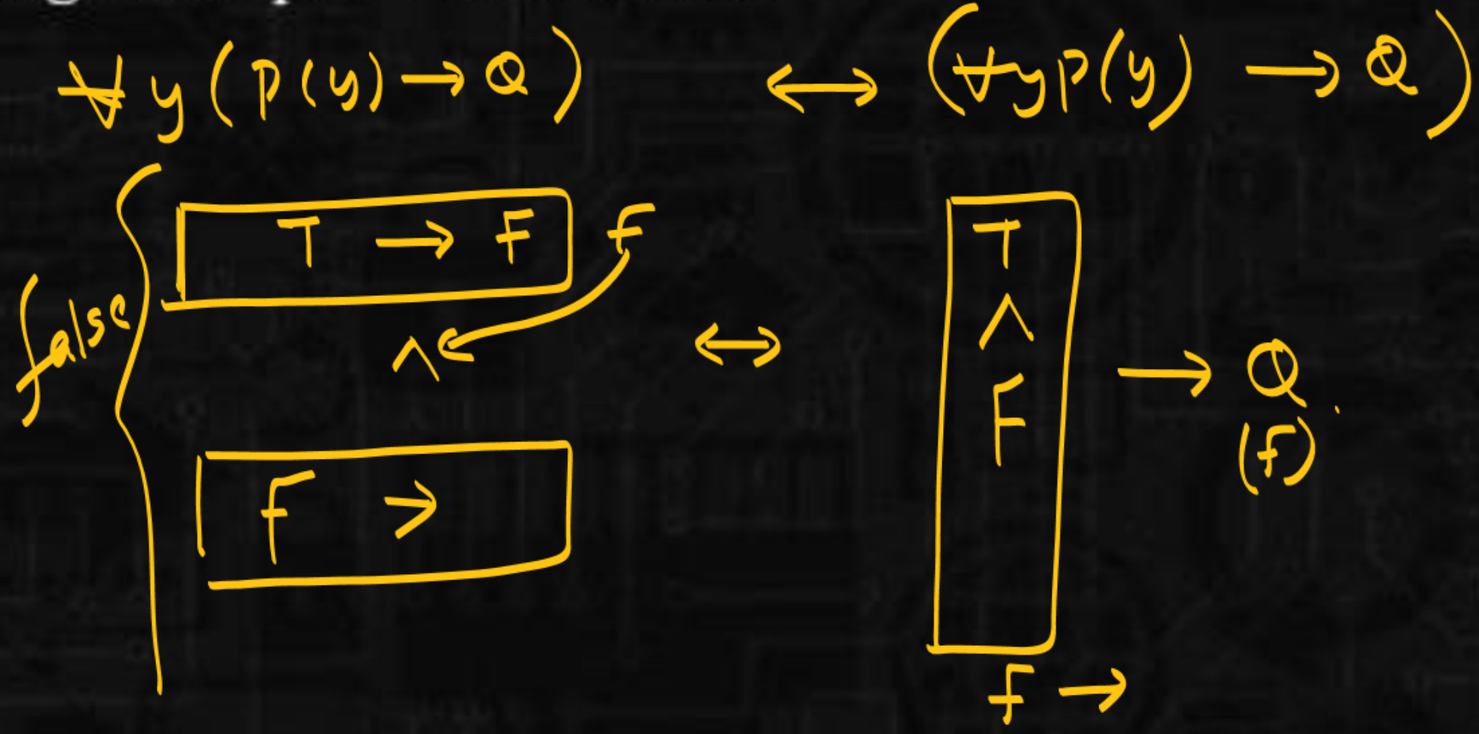
which of the following logical expression is valid?

(a) I only

(b) II only

(c) Both I and II

(d) None of these



[MCQ]

5. Consider following logical expressions:

I: $\forall y[P(y) \rightarrow Q] \leftrightarrow [\forall y\, P(y)] \rightarrow Q$

II: $\exists y[P(y) \rightarrow Q] \rightarrow [\exists y\, P(y)] \rightarrow Q$ (Invalid)

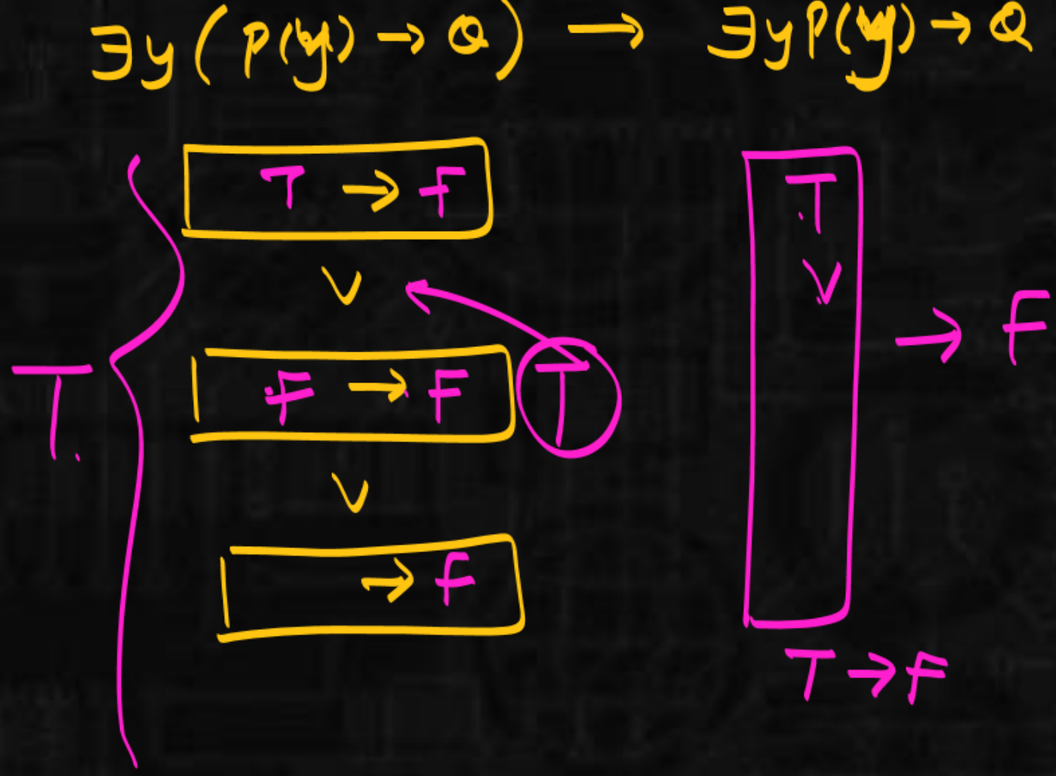
which of the following logical expression is valid?

(a) I only

(b) II only

(c) Both I and II

(d) None of these




THANK YOU GW
SOLDIERS !