Philosophy 142: Many-valued Logics Exercises

December 4, 2008

1. Which of the following hold in K_3, L_3, LP and RM_3? (you can check your answers on p.126 of the text)

(a) $\neg p \models p \supset q$
(b) $\neg (p \supset q) \models p$
(c) $p \supset q, q \supset r \models p \supset r$
(d) $\models p \supset (q \vee \neg q)$
(e) $\models (p \wedge \neg p) \supset q$

2. Consider the logic F where $\mathcal{V} = \{0, 1\}$, $\mathcal{D} = \{0\}$, and the truth functions for the connectives are classical. Which of the following hold in F?

(a) $\models p \vee \neg p$
(b) $\models p \wedge \neg p$
(c) $p, p \supset q \models q$

3. The philosophical motivation for the logics K_3 and L_3 is the existence of so-called 'truth-value gaps' while the motivation for the logics LP and RM_3 is the existence of 'truth-value gluts'. Design a 4-valued logic that accommodates both gaps and gluts. What are the truth functions for the connectives? What are the validities in your logic?