Philosophy 211 -- Assignment #2

I. Prove these sequents.

1. $P \rightarrow (Q \rightarrow R),\ \ S \rightarrow Q \ \vdash\ P \rightarrow (S \rightarrow R)$
2. $P \rightarrow (Q \rightarrow R),\ \ Q \rightarrow P \ \vdash\ Q \rightarrow R$
3. $Q \rightarrow (P \rightarrow R),\ \ R \rightarrow S \ \vdash\ P \rightarrow (Q \rightarrow S)$
4. $P \rightarrow (Q \rightarrow (R \rightarrow S)),\ \ Q \rightarrow P,\ \ Q \rightarrow R \ \vdash\ Q \rightarrow S$
5. $P \rightarrow Q,\ \ \sim S \rightarrow \sim Q \ \vdash\ \sim S \rightarrow \sim P$
6. $P \rightarrow (Q \rightarrow S),\ \vdash\ P \rightarrow (\sim S \rightarrow \sim Q)$
7. $(P \rightarrow \sim Q) \rightarrow S \ \vdash\ (Q \rightarrow \sim P) \rightarrow S$
8. $P \rightarrow (Q \rightarrow R),\ \ S \rightarrow P,\ \ \sim Q \rightarrow \sim T \ \vdash T \rightarrow (S \rightarrow R)$
9. $(P \rightarrow Q) \rightarrow S,\ \ \sim Q \rightarrow R \ \vdash\ (P \rightarrow \sim R) \rightarrow S$
10. $P \rightarrow (Q \rightarrow R),\ \ \sim R \ \vdash\ Q \rightarrow \sim P$

II. Paraphrase these English sentences into sentential logic.

1. Bill will attend the meeting only if neither Mary nor Tom will attend.
2. Exactly one of Mary and Bill will attend the meeting.

III. Which of the following are satisfactory representations in sentential logic of the following English sentence?

At least two of Bill, Mary, and Tom will attend the meeting.

A. $(B \vee (T \vee M)) \ \&\ (\sim B \vee (\sim T \vee \sim M))$
B. $(B \ \&\ M) \vee ((B \ \&\ T) \vee (T \ \&\ M))$
C. $(\sim B \rightarrow (T \ \&\ M)) \ \&\ (\sim T \rightarrow (B \ \&\ M))$
D. $(B \vee M) \ \&\ ((T \vee M) \ \&\ (B \vee T))$
E. $((B \vee T) \rightarrow M) \ \&\ ((T \vee M) \rightarrow B)$

IV. Mr. X always tells the truth on Monday, Tuesday, and Wednesday and never tells the truth on the other days. Ms. Y always tells the truth on Thursday, Friday, and Saturday and never tells the truth on the other days. On a certain day, you meet Mr. X and Ms. Y and they both say, "Yesterday I didn't tell the truth."

What day of the week is it? Explain your reasoning.