

Provide Natural Deduction Proofs of  
the following:

Logic Session - W4 & 5 - Mon 16<sup>th</sup> & 23<sup>rd</sup>

Q1: Constructive:  $(A \vee (B \wedge A)) \rightarrow A$

Q2: Constructive:  $((A \wedge B) \rightarrow C) \rightarrow A \rightarrow B \rightarrow C$

Q3: Classical:  $(\neg Q \rightarrow P) \rightarrow (\neg P \rightarrow Q)$

Q4: Classical:  $(\neg P \rightarrow Q \wedge R) \rightarrow P \vee Q$

Q5: Classical:  $\neg(P \wedge Q) \rightarrow (\neg P \rightarrow R) \rightarrow (\neg Q \rightarrow R) \rightarrow R$

Q6: Classical:  $\neg A \rightarrow (B \rightarrow C \vee A) \rightarrow (C \vee \neg B)$

Q7: Classical:  $\neg(A \wedge B) \rightarrow (\neg A \vee \neg B)$