Last Name: _____

First Name: _____

IV. NMR Basics Test
Level Two Checkout
XL200/QE300

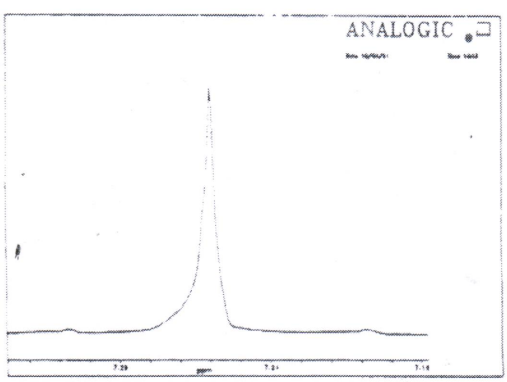
1. Diagram and label the three parts of the 1PULSE FTNMR experiment.

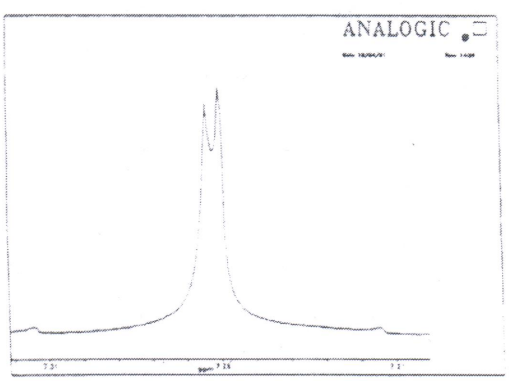
2. What is the result when you apply the FT to an FID (time domain signal)?

3. What is the relationship between numbers of points, spectral width, acquisition time, and digital resolution? Which of these parameters would you change if you wanted better digital resolution, and why?

4. What is the peak shape found in most solution NMR spectra?

5. What shim(s) should be adjusted if the peak shape is asymmetrically distorted? Label the shim probably responsible for the distortions below.





6. What is the single best factor to tell whether a sample is poorly shimmed?

7. What is the equation for determining signal-to-noise (S/N)?

8. Given that after 100 scans (5 minutes) the S/N for a sample is 10:1 on the XL200, and 35:1 on the QE300, how long will it take to achieve a S/N of 350:1 on each instrument?

9. What are the six factors that can affect the accuracy of a ^{1}H integration? Why? Are there any additional factors that affect the accuracy of a $^{13}C\{^{1}H\}$ integration? Why?

10. When would you use a homodecoupling experiment?

11. Is there a difference between the 1PULSE FTNMR experiment used to acquire $^{13}C\{^{1}H\}$ spectra and that used to acquire ^{1}H spectra? If yes, what is the difference?