Date received: _____
Date trained (V):_____ Date trained (B): _____

Two training sessions in groups of 4-5 will be scheduled after satisfactory completion of this quiz.

Please return completed quizzes to Letitia Yao in 196B Kolthoff or Box D-6.

APPLICATION FOR NMR TRAINING

NAME_____   ADVISOR_____

DATE _____   EMAIL_____

NMR LOGIN _____   BUDGET NO. _____

TIMES AVAILABLE _____

Circle one: undergraduate   graduate   post-doc   faculty   visiting scholar

I will need   ___low temp   ___high temp in my research on a regular basis.

*All users must demonstrate competence on the VAC-300 **before** being trained on the hands-on instruments.*
Answers are readily found in the instruction manuals on **http://nmr.chem.umn.edu** or other places on the internet.

1a. If you have you ever used an NMR spectrometer by yourself (not including the VAC-300), please check the manufacturer or list the specific model if known, e.g., Varian Inova or Bruker Avance II:
  Varian_____   Bruker_____   JEOL_____   Never used one _____

1b. At what institution(s) did you use these instruments? _____

2. Which magnets in the Chemistry NMR lab are shielded?

3. What precautions should you take if a magnet is *not* shielded?

4. What is a cryoprobe? Which instrument has one?

5. What quality of NMR tubes should you use on the 500s?

6. What is the purpose of the sample gauge?

7. What is the optimum solvent height for NMR samples:

       on the Varian instruments?_____   on the Bruker instruments? _____

8. What is the consequence of using a sample height/volume that is too short/small?

9. How should you dry an NMR tube?

10. On a 500 MHz spectrometer,
      ^{1}H nuclei resonate at   _____MHz
      ^{13}C nuclei resonate at _____MHz
      ^{19}F nuclei resonate at _____MHz

11. You have collected 4 scans on a particular sample and would like to double the signal-to-noise. How many scans should you collect?

12. Define the following acronyms:

NMR

FID

PFG

13. What type of information do these experiments typically provide?

DEPT

COSY

NOE

HETCOR

HMQC

HSQC

HMBC

14. Why should you run an HMQC or HSQC instead of a HETCOR or a 1D carbon spectrum?

15. What nuclei can you run on a routine basis on each of the following instruments?

VAC-300:	VI-500:
VI-300:	AV-500:
	HD-500:

16. What is the temperature range of the probe on each of the following instruments?

VAC-300:	VI-500:
VI-300:	AV-500:
	HD-500:

17. True or False. You never have to spin a sample to run an experiment.

18. What is the purpose of spinning?

19. What is the purpose of the lock? To find the lock, what parameter are you adjusting?

20. What nucleus do we normally use for "locking"? Why?

21. If you can't find the lock or the lock signal is very erratic, i.e., bouncing up and down, what are some common things to check?

22. What is the difference between lock power and lock gain?

23. What is the purpose of shimming? How can you tell if you are shimming well?

24. The 3 spectra below all have at least one shim incorrectly set. Which shim(s) should be adjusted for each spectrum to achieve a good lineshape?
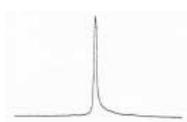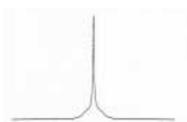
25. What is the purpose of tuning?

26. Why is it important to know the T1 relaxation time of your molecule?

27. What is the difference between a DEPT90 and a DEPT135?

28. Which mouse button controls the height of the peaks or integrations?

29. What is a 90 degree pulse?

30. What should you do if you break an NMR sample *outside* a magnet?

31. What should you do if you break an NMR sample *inside* a magnet?

32. In what condition will you leave the spectrometer when you are finished with your experiment? Why?

Instrument specific questions:

33. Please list the instrument-specific parameter or command for the following:

	Varian (Agilent)	**Bruker**
Acquisition time		
Relaxation delay		
Pulse width		
Start acquisition		
Process data		
Spectral window		
Middle of spectral window		
Number of scans		
Dummy scans		
Automatic phase		
Process spectrum		
Number of increments in a 2D spectrum		
Receiver gain		
Load standard shims		
In a 2D experiment, what	**parameter would you**	**increase for better:**
signal-to-noise		
resolution		

34. Answer the following:

Question	**Varian (Agilent)**	**Bruker**
Define an "experiment"		
How do you expand a spectral region?		
How do you stop an acquisition while retaining data?		
How do you change the spectral width?		
How do you look at a spectrum before it is completed?		
How do you manually phase a spectrum?		
What does "prosol" do?	n/a	

35. How long did it take you to complete this quiz?