

# Unit 5 - One-dimensional proton NMR

## Course outline

How does an NPTEL online course work?

Week 0 Assignment

Introduction to NMR spectroscopy

Chemical shifts and J-coupling

One-dimensional proton NMR

Introduction to general one dimensional NMR experiment

Practical aspects of recording a 1D NMR experiment I

Practical aspects of recording a 1D NMR experiment II

Practical aspects of recording a 1D NMR experiment III

NMR Data processing

Quiz : Week 3 Assignment

One dimensional NMR of X-nuclei (<sup>13</sup>C, <sup>15</sup>N, <sup>31</sup>P and <sup>19</sup>F)

Homonuclear 2D NMR

Heteronuclear 2D NMR

Structure determination of molecules

Advanced topics (Solvent suppression, Drug Discovery, DOSY)

Text Transcripts

Weekly Feedback forms

Video download

## Week 3 Assignment

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2020-02-19, 23:59 IST.**

1) How many mg of a compound having a molecular weight of 500g/mol will be needed to make 0.5 mL sample of 41 mM concentration? 1 point

- 1 mg  
 2 mg  
 3 mg  
 4 mg

No, the answer is incorrect.

Score: 0

Accepted Answers:  
1 mg

2) The acquisition time used for recording the FID in an NMR experiment depends on: 1 point

- The concentration of the sample  
 The T1 relaxation time of the protons  
 The T2 relaxation time of the protons  
 The measurement time needed

No, the answer is incorrect.

Score: 0

Accepted Answers:  
The T2 relaxation time of the protons

3) Which of the following does not increase the signal to noise ratio S/N of an NMR experiment? 0 points

- Sample concentration  
 Magnetic field strength  
 Type of probe used  
 All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:  
All of the above

4) Which of the following nuclei have lowest sensitivity in NMR experiment? 1 point

- <sup>1</sup>H  
 <sup>11</sup>B  
 <sup>13</sup>C  
 <sup>19</sup>F

No, the answer is incorrect.

Score: 0

Accepted Answers:  
13C

5) Which of the following if not done properly will lead to increased line width of peaks? 1 point

- Shimming  
 Tuning  
 Pulse width calibration  
 Incorrect setting of the relaxation delay

No, the answer is incorrect.

Score: 0

Accepted Answers:  
Shimming

6) Which of the following RF pulses will give the highest or largest signal? 1 point

- 90° pulse  
 180° pulse  
 720° pulse  
 360° pulse

No, the answer is incorrect.

Score: 0

Accepted Answers:  
90° pulse

7) The T2 relaxation time of a molecule is 100 ms. Based on this, which of the following would most likely be the acquisition time to be used? 1 point

- 50 ms  
 100 ms  
 200 ms  
 300 ms

No, the answer is incorrect.

Score: 0

Accepted Answers:  
300 ms

8) Which of the following parameters affects the dynamic range in an NMR spectrum? 1 point

- Relaxation delay between scans  
 The relative concentration of the solute and solvent  
 Number of scans used  
 Total measurement time

No, the answer is incorrect.

Score: 0

Accepted Answers:  
The relative concentration of the solute and solvent

9) The T1 relaxation of a proton is 2.4 seconds. Among the following values of relaxation delay between scans will be most suitable for a 1D experiment? 1 point

- 2 seconds  
 3 seconds  
 4 seconds  
 5 seconds

No, the answer is incorrect.

Score: 0

Accepted Answers:  
3 seconds

10) Which of the following molecule will have two proton peaks with one showing triplet and one quartet? 1 point

- CH<sub>2</sub>F-CH<sub>2</sub>-CO-CH<sub>2</sub>-CH<sub>2</sub>F  
 CH<sub>2</sub>Cl-CH<sub>2</sub>-O-CHCl-CH<sub>3</sub>  
 CH<sub>3</sub>-CH<sub>2</sub>-OH  
 CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>3</sub>

No, the answer is incorrect.

Score: 0

Accepted Answers:  
CH<sub>3</sub>-CH<sub>2</sub>-OH