Unit 2 - Introduction to Basics of NMR

Week 1_assignment

The due date for submitting this assignment has passed. Assignment submitted on 2019-02-08, 13:40 IST

1) In the electromagnetic spectrum, which of the following pair have the highest frequency difference?

- X-rays and Radio waves
- Ultra-violet waves, and IR radiation
- Radio waves and Gamma Rays
- Gamma Rays and X rays

No, the answer is incorrect.
Score: 0
Accepted Answers: Radio waves and Gamma Rays

2) Which of the following nuclei has an integral spin value?

- $^1$H
- $^{14}$N
- $^{16}$O
- $^{32}$S

No, the answer is incorrect.
Score: 0
Accepted Answers: $^{14}$N

3) How many energy states are there for nucleus spin value $I = \frac{3}{2}$?

- 4
- 3

No, the answer is incorrect.
Score: 0
Accepted Answers: 4

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4) How many peaks will be observed in the 1D 1H NMR spectra of TMS (Tetra Methyl Silane)?

- 4
- 3
- 2
- 1

No, the answer is incorrect.
Score: 0
Accepted Answers: 1

5) A nucleus has an NMR frequency of ~ 81 MHz in an 18.8 Tesla magnetic field. Identify the nucleus.

- $^{13}$C
- $^1$H
- $^{19}$F
- $^{15}$N

No, the answer is incorrect.
Score: 0
Accepted Answers: $^{15}$N

6) What is the typical duration of a 90° RF pulse used for NMR experiments?

- 10 milliseconds
- 10 picoseconds
- 10 microseconds
- 10 seconds

No, the answer is incorrect.
Score: 0
Accepted Answers: 10 microseconds

7) A peak in a proton NMR spectrum is located at 4 ppm from the reference (TMS) on a 400 MHz NMR spectrometer. If the reference is set to 0 ppm, calculate the separation of the same peak from the reference in 800 MHz spectrometer.

- 800 Hz
- 1600 Hz
- 3200 Hz
- 2400 Hz

No, the answer is incorrect.
Score: 0
Accepted Answers: 3200 Hz

8) T1 relaxation refers to?

- Spin noise
- Spin-Lattice Relaxation

No, the answer is incorrect.
Score: 0
Accepted Answers: Spin-Lattice Relaxation
9) In a molecule, a given proton A has a J-coupling of 5 Hz with two equivalent protons and 10 Hz coupling with another proton. How many J-Multiplet lines will be expected for proton A in the 1D-NMR spectrum?

- 3
- 6
- 8
- 4

No, the answer is incorrect.
Score: 0
Accepted Answers:
Spin-Lattice Relaxation
Chemical exchange

10) A compound with molecular formula C₄H₈O had three types of peaks in the 1D 1H NMR spectrum. (i) Triplet at 1 ppm with relative integral value 3, (ii) a singlet at 2 ppm with relative integral 3 and (iii) a quartet at 2.5 ppm with relative integral 2. What is the possible molecular structure of this compound?

- CH₃-CH₂-CH₂-OH
- CH₃-CH₂-CH₂-CHO
- CH₃-CH₂-O-CH₃
- CH₃-CH₂-CO-CH₃

No, the answer is incorrect.
Score: 0
Accepted Answers:
CH₃-CH₂-CO-CH₃