# Organic Chemistry

## NMR Spectroscopy - Splitting Patterns

**Given:**

The task is to identify the correct name of the splitting pattern shown in the provided image from the options given:

**Options:**

- A) singlet
- B) doublet
- C) triplet
- D) quartet

**Solution:**

**Step 1: Introduction to NMR Splitting Patterns**

Nuclear Magnetic Resonance (NMR) spectroscopy is a powerful technique used for determining the structure of organic compounds. One important feature of an NMR spectrum is the splitting pattern, which shows how a signal is split due to coupling with neighboring hydrogen atoms. The splitting follows the n+1 rule, where n is the number of neighboring protons, and results in a characteristic pattern:

- Singlet: no splitting; single peak
- Doublet: splitting into two peaks
- Triplet: splitting into three peaks
- Quartet: splitting into four peaks

**Explanation:** Introduction of the types of splitting patterns based on the number of neighboring protons as per the n+1 rule.

**Step 2: Analysis of the Given Splitting Pattern**

The provided image shows a splitting pattern with four peaks.

**Explanation:** Identification of the pattern by counting the distinct number of peaks observed.

**Step 3: Identifying the Pattern**

Since the splitting pattern shows four peaks, it corresponds to a quartet. A quartet arises from coupling with three equivalent neighboring protons (n = 3), which according to the n+1 rule leads to 3+1 = 4 peaks.

**Explanation:** The pattern is identified as a quartet because it has four peaks, indicating coupling with three neighboring protons.

**Supporting Statement for Each Step:**

1. Introduction to the concept of splitting patterns is essential for understanding how to identify them.
2. Counting the number of peaks correctly determines the type of splitting pattern.
3. Using the n+1 rule and the observed number of peaks correctly identifies the pattern as a quartet.

### Final Solution:

The correct name of the splitting pattern shown in the image is **D) quartet**.