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| **Student:** | | | | | | |
| School | Cambridge High School | | | | | |
| Teacher | Sarah Gaze (GZ) | | | | | |
| Standard No. | AS 91388 Chemistry 3.2 | | | | | |
| Standard Title | Demonstrate understanding of spectroscopic data in chemistry | | | | | |
|  | | | | | | |
| **Achieved** | | **Merit** | **Excellence** | | | |
| Carry out quantitative analysis. | | Carry out in-depth quantitative analysis. | Carry out comprehensive quantitative analysis. | | | |
| You will be given the empirical formula of each molecule to be analysed  You will have three sets of spectra: Mass Spec, IR and 13C NMR for each molecule  You will have annotated data tables for IR absorption frequencies and 13C NMR chemical shifts  You will be provided with a periodic table containing Mr of elements | | | | | | |
|  | | | | | | |
| **Key requirements: (tick)** | | | | A | M | E |
| **ACHIEVED:** For a given structure any **two** of the following are identified: (evidence could be found from annotated spectra) | | | |  |  |  |
| MASS SPEC: The molecular ion in mass spec data (molecule with 1 electron removed) | | | |  |  |  |
| IR: key peaks in IR spectra and links to functional groups | | | |  |  |  |
| 13C NMR: the number of carbon environments in a molecule and relate these to 13C NMR | | | |  |  |  |
| **MERIT:** links of key aspects to **all three** spectra to the structure | | | |  |  |  |
| MASS SPEC: linked molar mass to compound (structural→calculation of molar mass) | | | |  |  |  |
| IR: identifying peaks labelled – linked to bond type with numerical data | | | |  |  |  |
| 13C NMR: structural formula linked to number of carbon environment AND peaks on spectra | | | |  |  |  |
| **EXCELLENCE:** justified structure by integrating spectroscopic data | | | |  |  |  |
| MASS SPEC: identification of Molar mass of various fragments of the original compound and links to points on the spectra (especially halogen – Br/Cl and CH2/CH3) | | | |  |  |  |
| IR: identification of peaks (with numerical data) AND justifying by absence of peaks that the compound is not from another functional group | | | |  |  |  |
| 13C NMR: justified carbon environments linking compound to spectra AND chemical shift data | | | |  |  |  |
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| **Sufficiency statement:** | | | | | | |
| **Comments** |  | | | | | |