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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 |
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| **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 analysedYou will have three sets of spectra: Mass Spec, IR and 13C NMR for each moleculeYou will have annotated data tables for IR absorption frequencies and 13C NMR chemical shiftsYou will be provided with a periodic table containing Mr of elements |
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| **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** |  |