

Student 4: High Achieved

NZQA Intended for teacher use only

Mass Spec:

| m/z ratio | group |
|-----------|---|
| 88 | C ₂ H ₄ O is the empirical formula and has a mass of 44 so compound must have formula C ₄ H ₈ O ₂ . This is the molecular ion peak |

IR:

| Wavenumber(cm ⁻¹) | Characteristic group |
|-------------------------------|----------------------|
| 2980 broad | |
| 1710 sharp | C=O |

NMR:

| Chemical shift (ppm) | Characteristic group |
|----------------------|----------------------|
| 13 | C |
| 19 | C |
| 38 | C |
| 180 | C |

There are 4 carbons in the compound

From the three graphs the unknown compound is methyl propanoate which would have 4 different carbon environments.

