A level Chemistry A

H432/02 Synthesis and analytical techniques

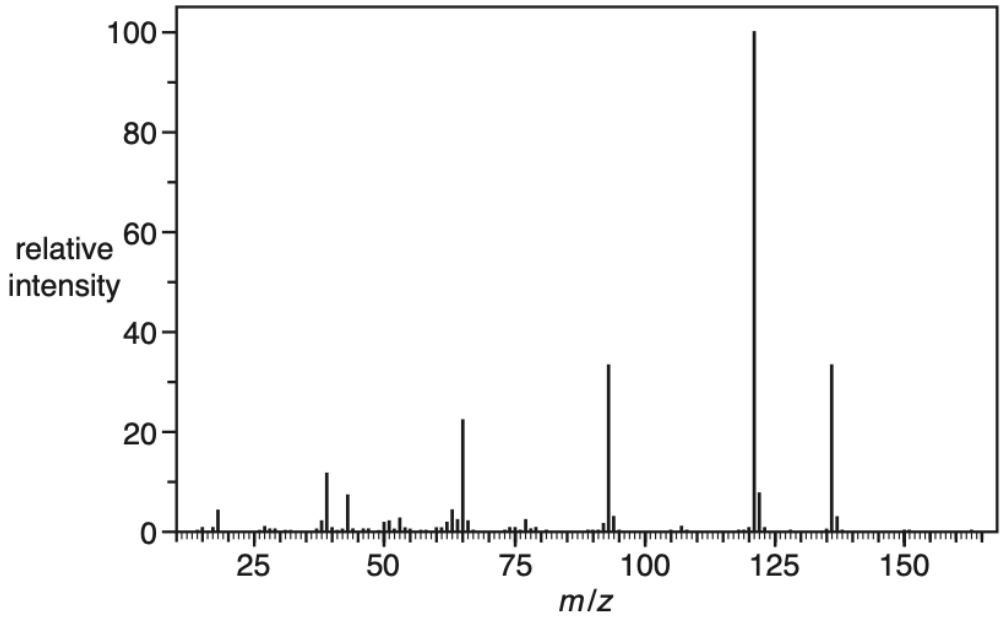
Question Set 12

6. A chemist analyses a naturally occurring aromatic compound.

(a) The percentage composition and mass spectrum of the compound are shown below.

Percentage composition by mass: C, 70.58%; H, 5.92%; O, 23.50%.

Mass spectrum



Determine the molecular formula of the compound.

Show your working.

[3]

(b) Qualitative tests are carried out on the aromatic compound. The results are shown below.

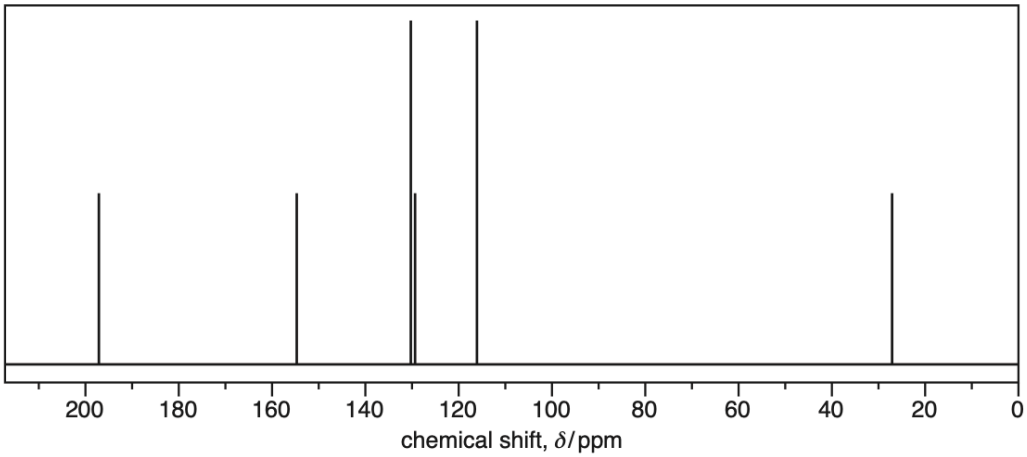
Test	**Acidity**	**Na_2CO_3(aq)**	**2,4-DNP**	**Tollens' reagent**
Observation	pH = 5	No observable change	Orange precipitate	No observable change

Determine the functional groups in the compound.

Explain your reasoning.

[3]

(c) The carbon-13 NMR spectrum of the compound is shown below.



Using the spectrum and the results from **(a)** and **(b)**, determine the structure of the compound.

Explain your reasoning.

[3]

Total Marks for Question Set 12: 9