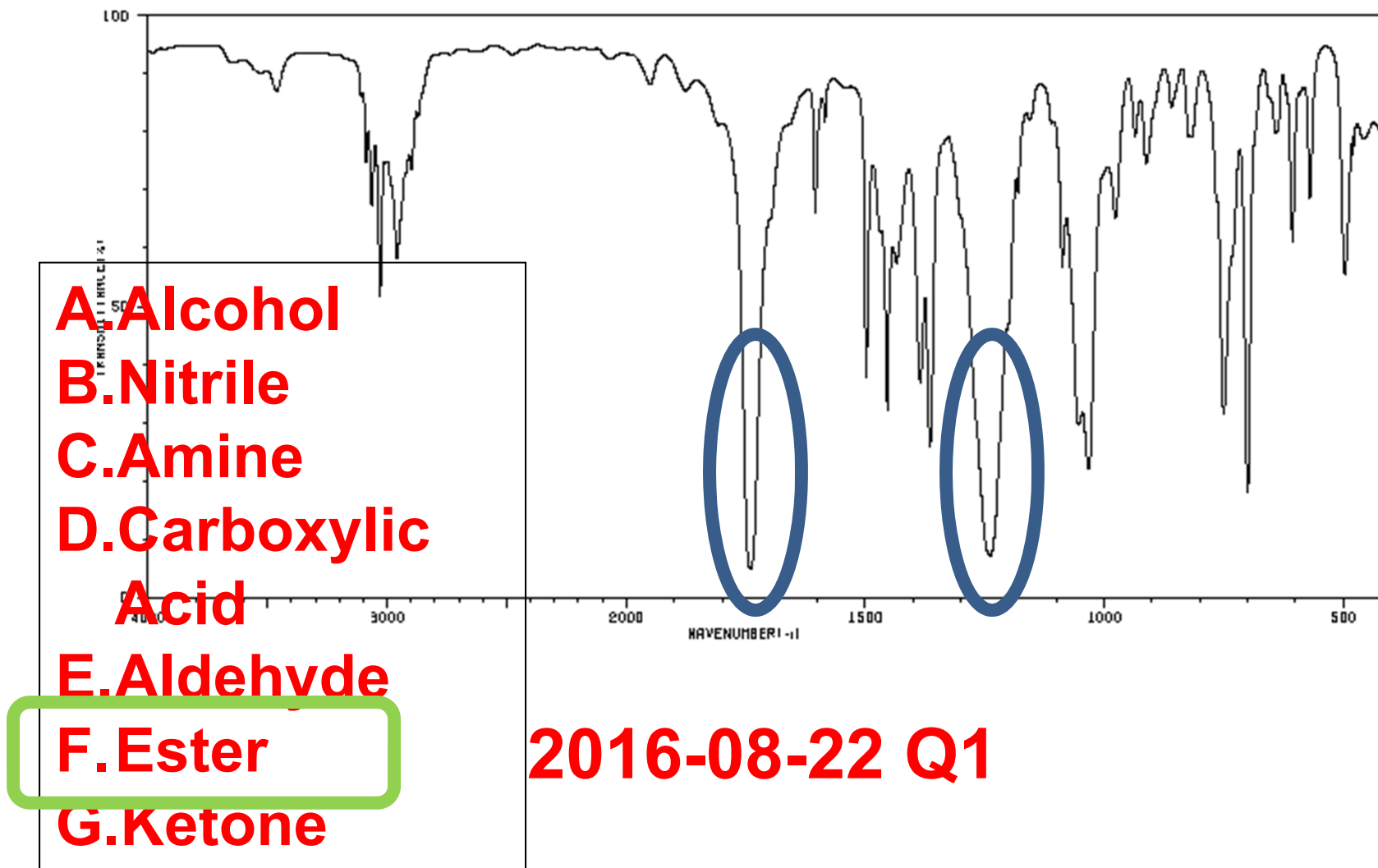


What functional groups?



Order of Coverage (Exam 1)

	Homework Assignment	Due Date
1	B4-11-01 IR Functional Groups (wDeadline)	Tuesday, August 23
2	B7-14-02 Mass Spec - Molecular Ion (wDeadline)	Wednesday, August 24
3	B7-14-03 Mass Spec - Isotope Effects (wDeadline)	Thursday, August 25
4	B7-15-01 Number of Peaks ¹ H NMR Spectra (wDeadline)	Friday, August 26
5	B7-15-06 Number of Peaks ¹³ C NMR (wDeadline)	Saturday, August 27
6	B7-15-02 Theoretical NMR Chemical Shift (wDeadline)	Sunday, August 28
7	B7-15-03 Theoretical NMR Integration (wDeadline)	Monday, August 29
8	B7-15-04 Theor. NMR Spin-Spin Splitting (wDeadline)	Tuesday, August 30
9	B7-15-05 NMR Spectroscopy Problems (wDeadline)	Wednesday, August 31
10	B7-15-07 ¹³ C NMR Structure ID (wDeadline)	Thursday, September 1
11	B7-13-01A Nomenclature Alkyl Halides (wDeadline)	Friday, September 2
12	B7-13-01B Alkyl Halide Nomenclature (wDeadline)	Saturday, September 3
13	B7-13-02A Halogenation of Alkanes (wDeadline)	Sunday, September 4
14	B7-13-02B Halogenation of Alkanes (wDeadline)	Monday, September 5

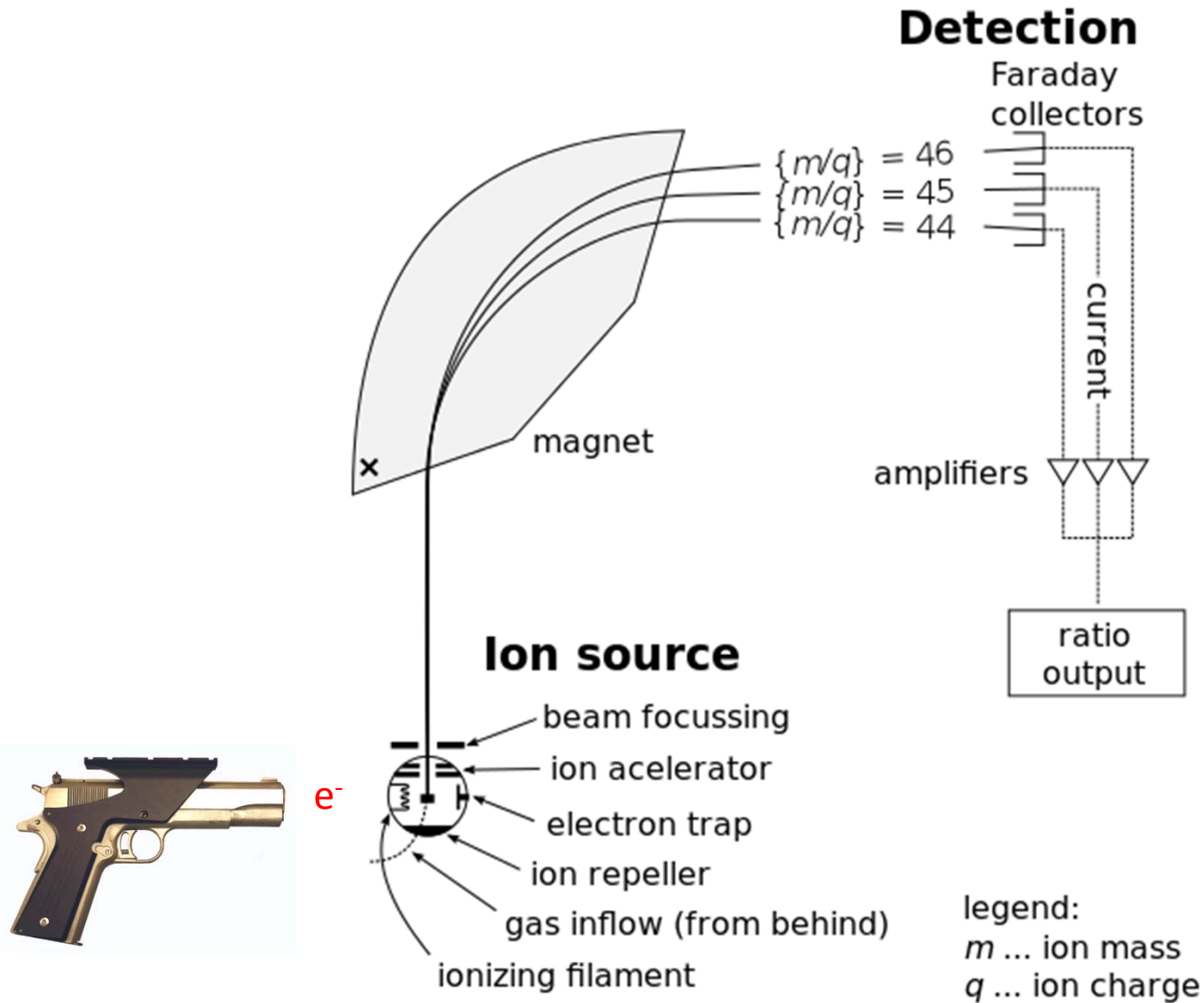
Order of Coverage (Exam 1)

	Homework Assignment	Due Date
15	B7-13-03A Oxidation and Anti-oxidants (wDeadline)	Tuesday, September 6
16	B7-19-01 Aromaticity (wDeadline)	Wednesday, September 7
17	B7-19-02B Arene Nomenclature (wDeadline)	Thursday, September 8
18	B7-19-03A Halogenation of Arenes (wDeadline)	Friday, September 9
19	B7-19-03B Halogenation of Arenes (wDeadline)	Friday, September 9
20	B7-19-04A Arene Rxns Inorganic Acids (wDeadline)	Saturday, September 10
21	B7-19-04B Arene Rxns Inorganic Acids (wDeadline)	Saturday, September 10
22	B7-19-05A Friedel-Crafts (wDeadline)	Sunday, September 11
23	B7-19-05B Friedel-Crafts (wDeadline)	Sunday, September 11
24	B7-19-06 Arene Mechanistic Issues (wDeadline)	Wednesday, September 12
25	B7-19-06B Arene Mechanisms (wDeadline)	Wednesday, September 12
26	B7-19-07A Nucleophilic Aromatic Subs (wDeadline)	Thursday, September 13
27	B7-19-07B Nucleophilic Aromatic Subs (wDeadline)	Friday, September 14
	Exam 1	September 18, 19, 20

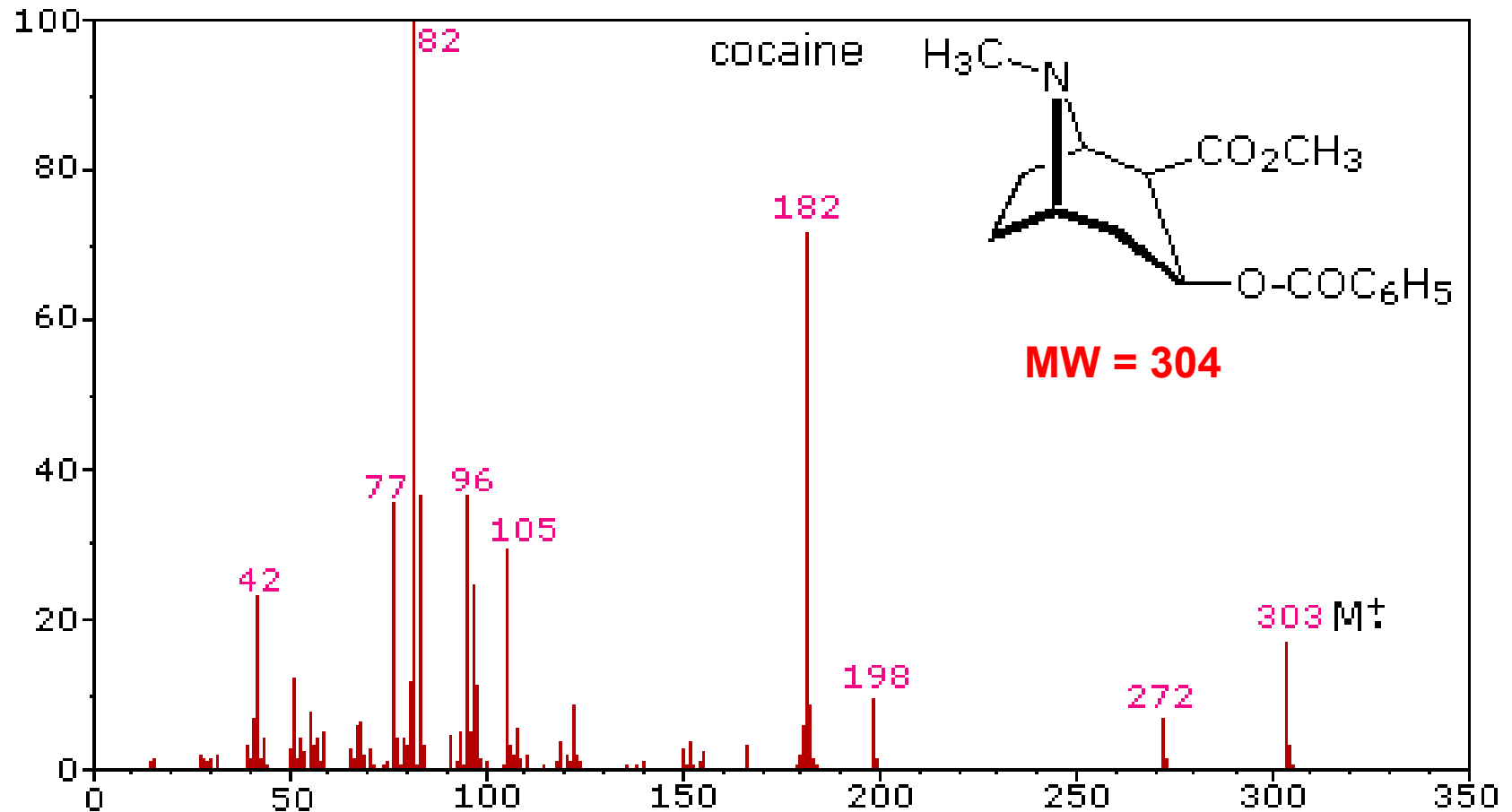
Exam 1

- **Time:**
 - Tuesday, September 20: 7:00 – 9:00PM
 - Wednesday, September 21: 7:00 – 9:00PM OR
 - Thursday, September 22: 7:00 – 10:00PM
- **Location – Soc/Anthro Testing Center**
 - Chapters will be covered in this order: Chapter 11, 14, 15, 19, 13
- **Practice Exams are Posted**
 - B7-19-98A Practice Exam 1A
 - B7-19-98B Practice Exam 1B
- **Deadline for alternate arrangements is Monday, 9/19/2016 at 4:30 PM (i.e., close of business)**
 - An oral make-up exam will be required for making up the exam for all students not taking the exam on the above dates or having already made prior arrangements

Mass Spectrometry

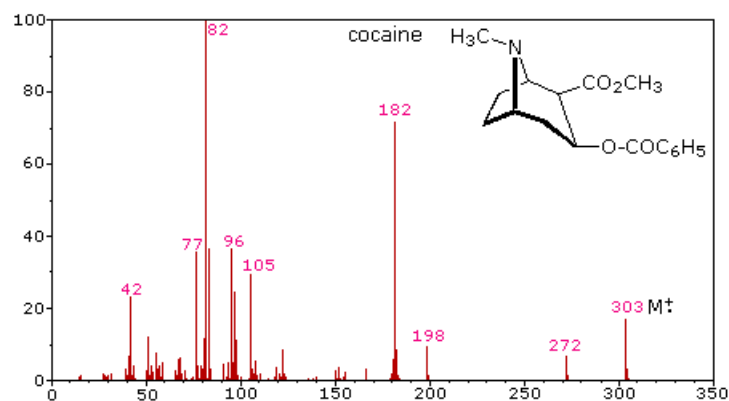


Typical Mass Spectrum

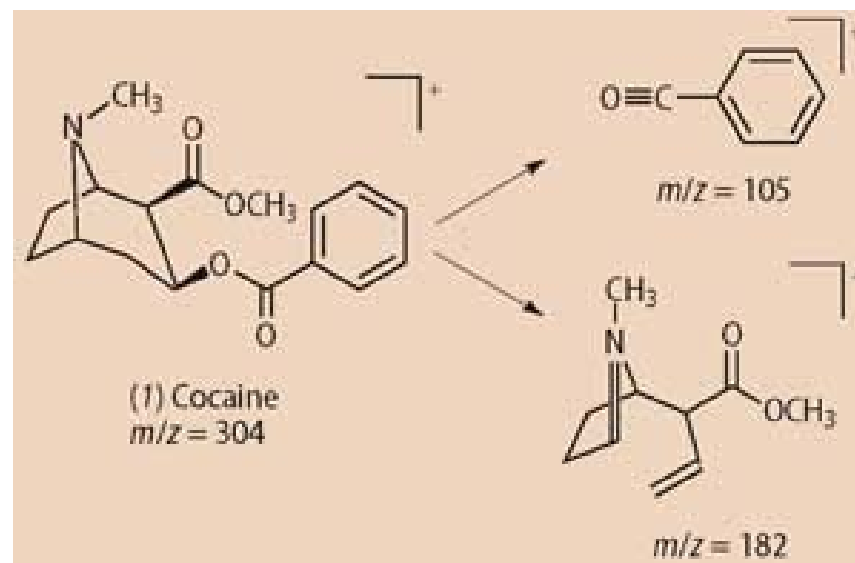


Fragmentations

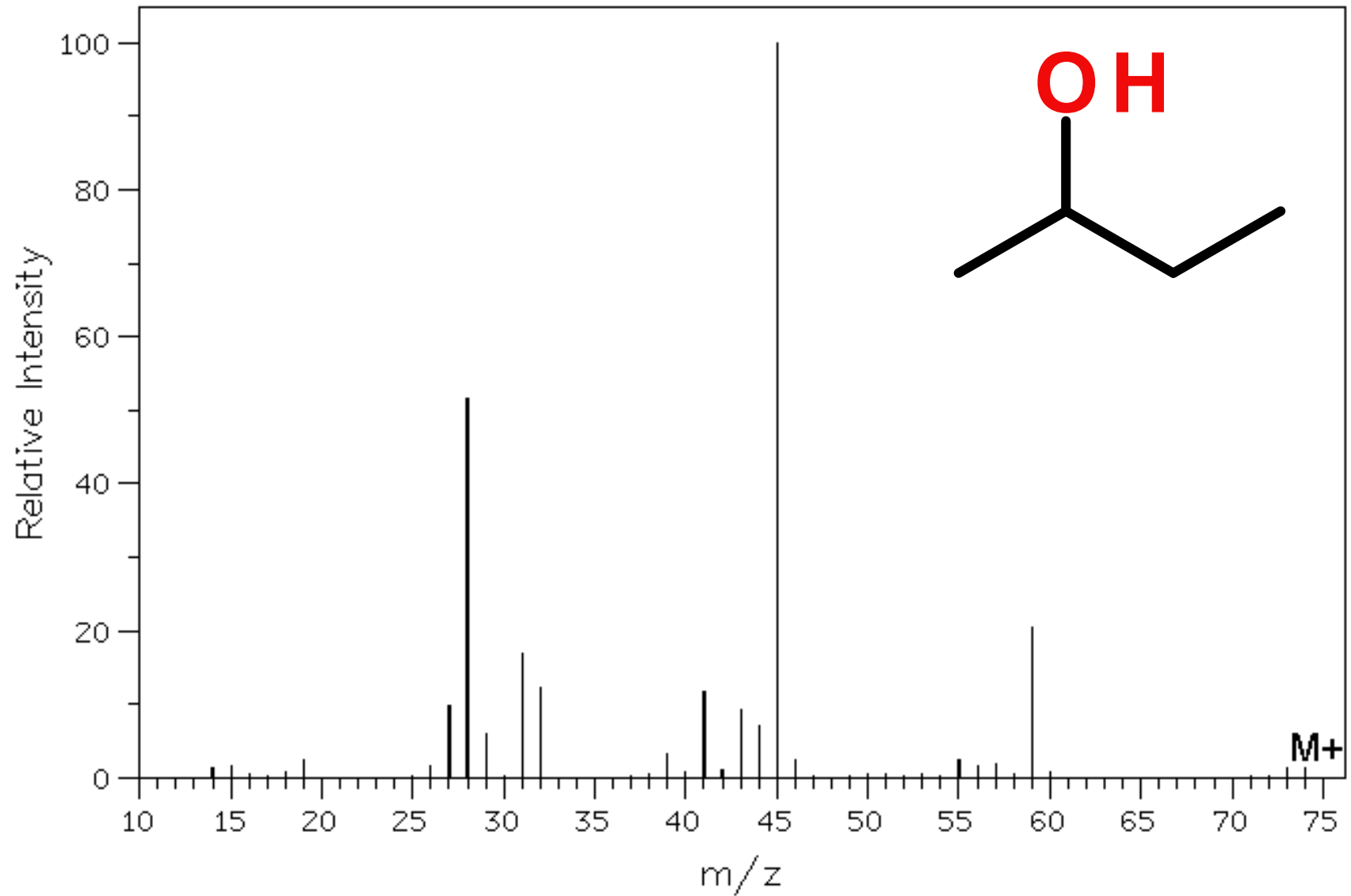
Mass Spectrum



Reactions of radical cations



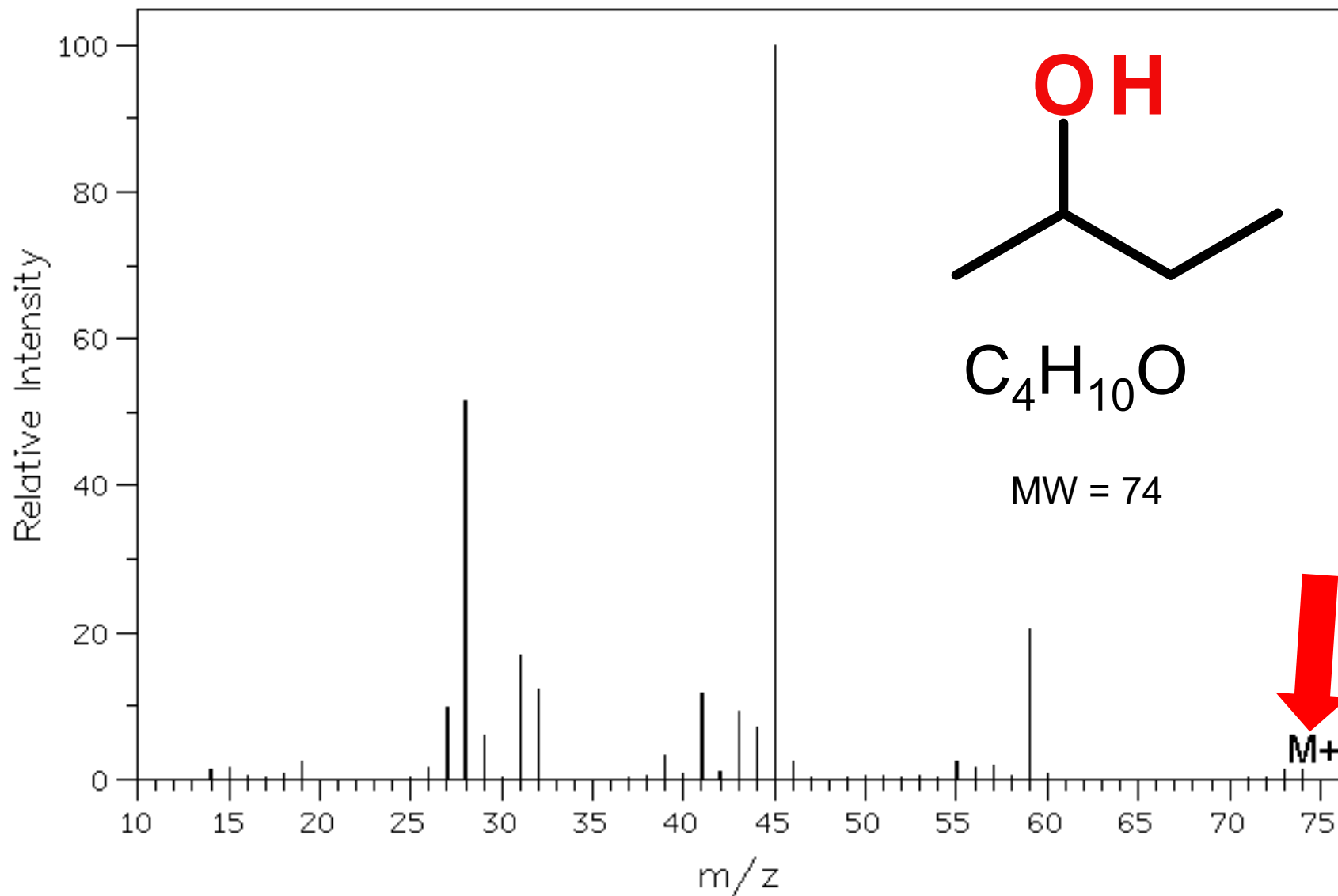
Typical Mass Spectrum



Molecular Weight of 2-Butanol, C₄H₁₀O

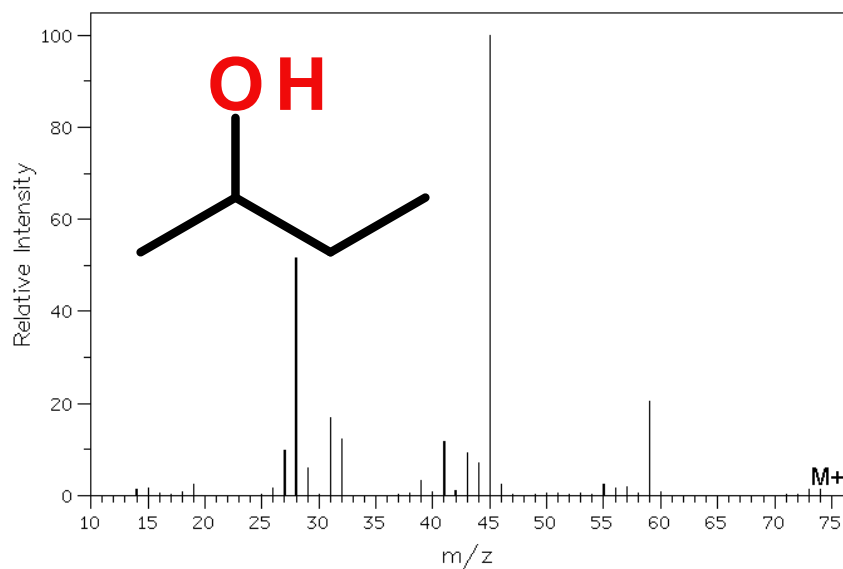
Atom	Number	Atomic Weight	Contribution to Weight
C	4	12	48
H	10	1	10
O	1	16	16
C₄H₁₀O			74

Typical Mass Spectrum

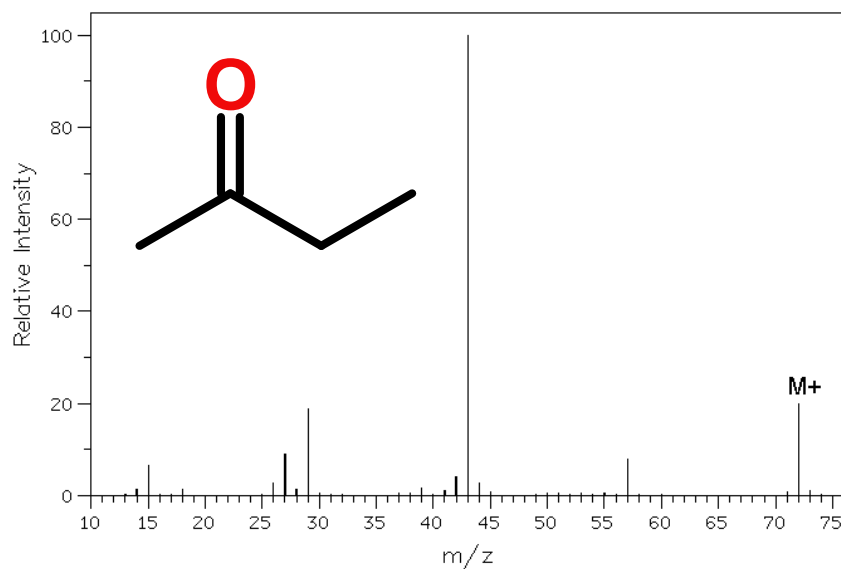


Typical Mass Spectrum

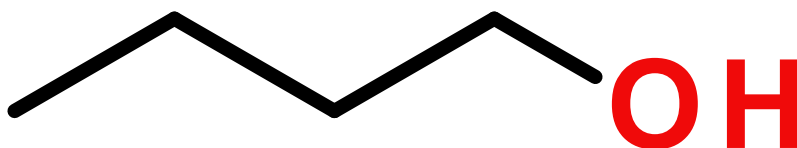
2-butanol



2-butanone



What would be the m/z ratio of the parent ion of 1-butanol? Give a number



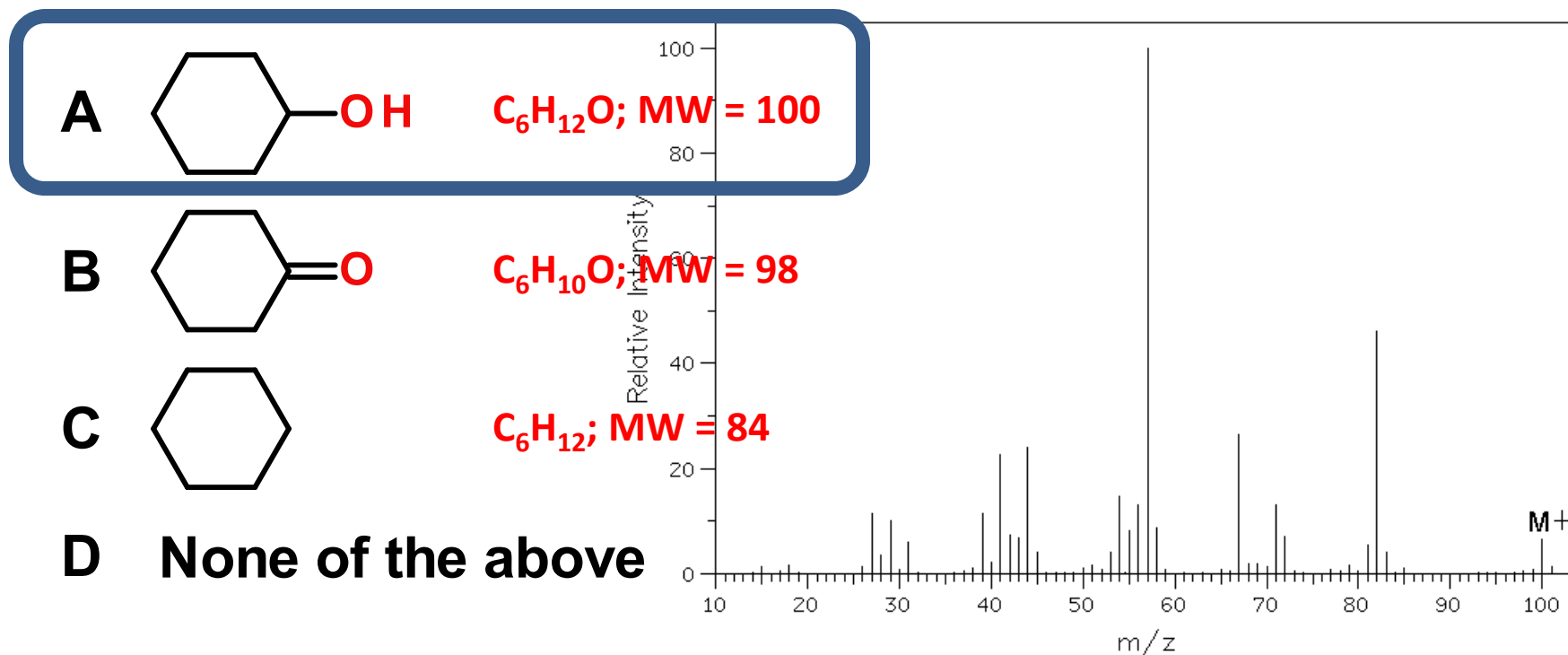
Important Atomic Weights	
H	1
C	12
N	14
O	16

2016-08-22 Q2

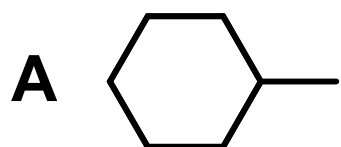
Answer = 74

Which of the following compounds would be consistent with the following mass spectrum?

2016-08-22 Q3



Which of the following compounds would be consistent with an M^+ ion with an m/z ratio of 95?

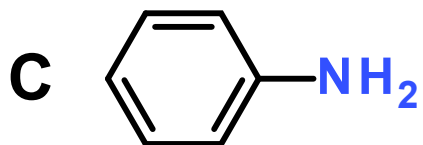


C_7H_{14} ; MW = 98

2016-08-22 Q4



C_7H_8 ; MW = 92



C_6H_7N ; MW = 93



C_6H_6O ; MW = 94

E None of the above

Important
Atomic
Weights

H 1

C 12

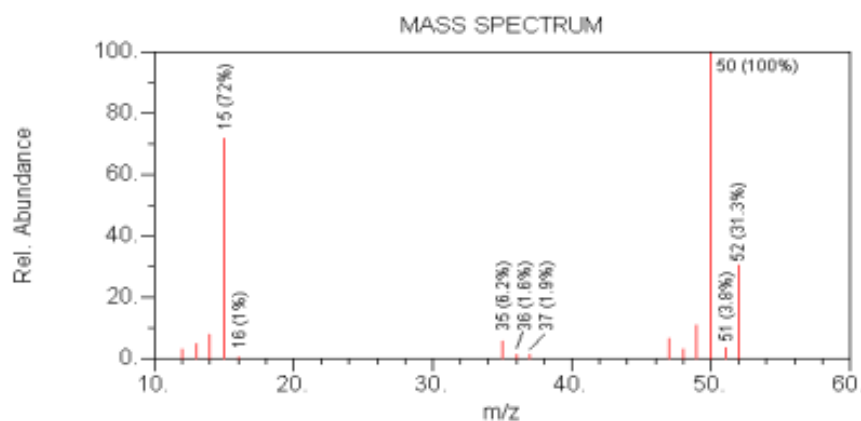
N 14

O 16

Natural Abundance Effects on M^+ and $M+2^+$ Ions

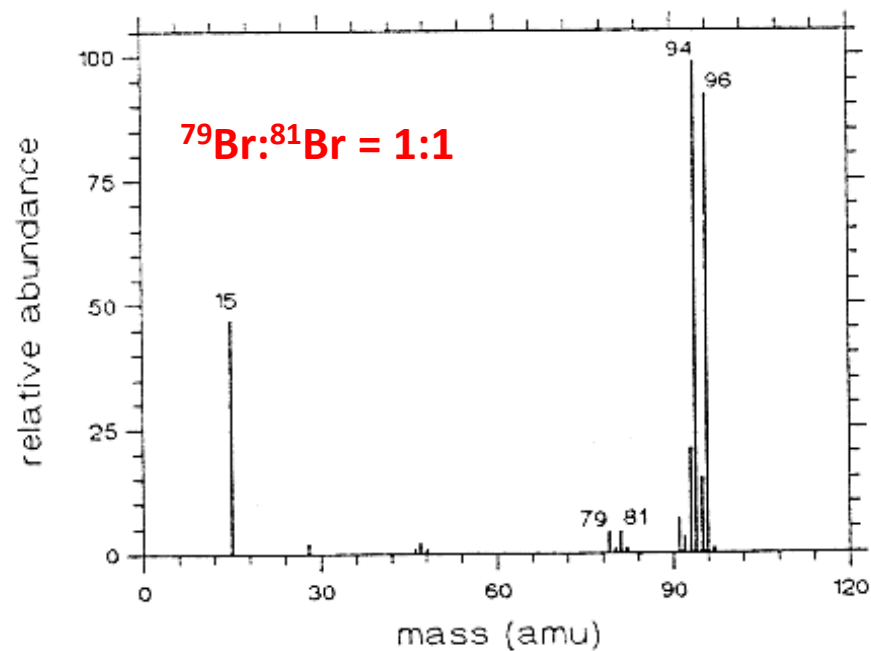
Chloromethane

$^{35}\text{Cl}:^{37}\text{Cl} = 3:1$

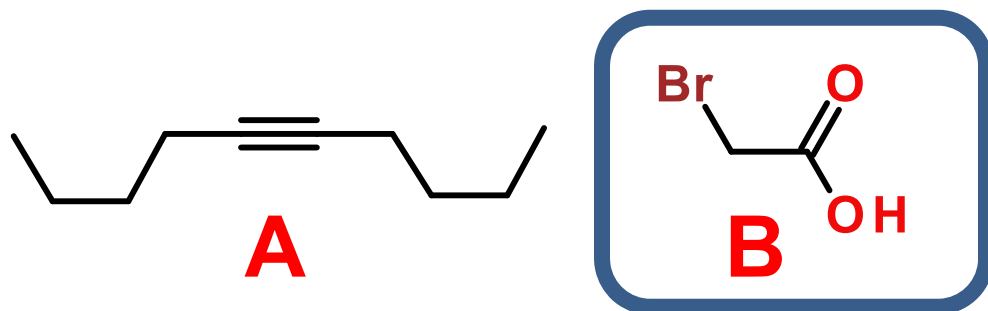


Bromomethane

$^{79}\text{Br}:^{81}\text{Br} = 1:1$

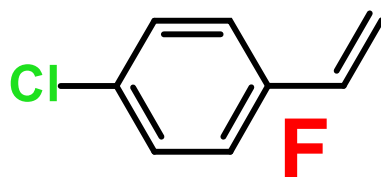
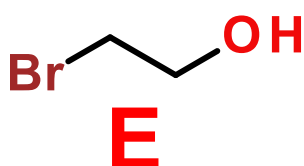
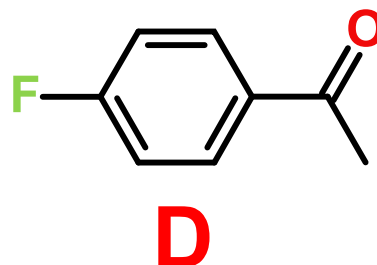
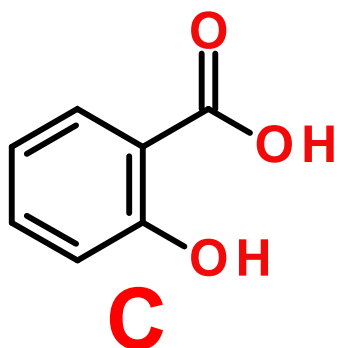


In a GCMS experiment, a compound shows a 1:1 height ratio of its M peak at 138 mass units and its M+2 peak at 140 mass units. Which compound(s) is consistent with these results?



2016-08-22 Q5

Important Atomic Weights	
H	1
C	12
N	14
O	16



G. None of the above

Number of carbon atoms =

Intensity of M+1 peak

0.11 x Intensity of M peak

The mass spectrum of an unknown compound has a molecular ion peak with a relative intensity of 55.08% and an M+1 peak of 2.42%. How many carbon atoms are in the compound?
(Fill in an integer number)

Answer = 4

2016-08-22 Q6