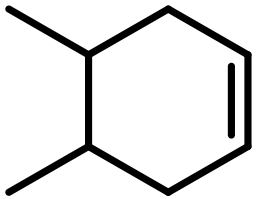
Give the major product(s) of the following reaction.

2016-09-07 1



NBS

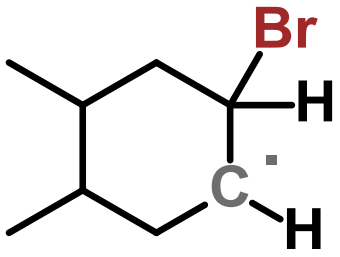
heat

??

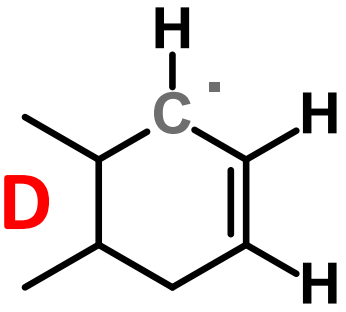
A HBr

B $Br^{\cdot}$

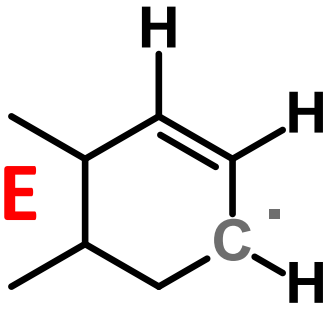
C



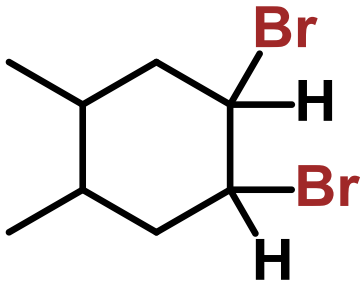
D



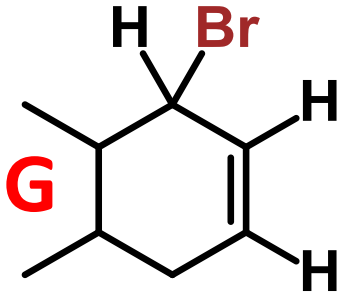
E



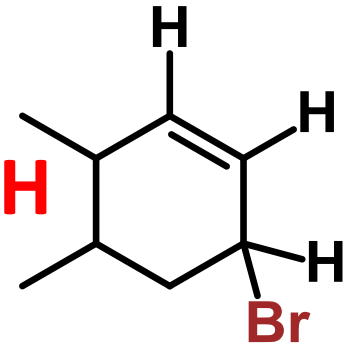
F



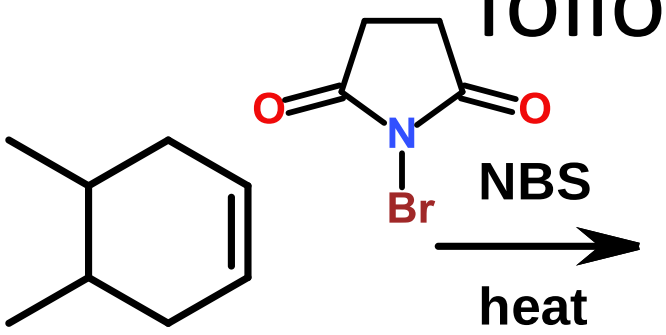
G



H



Give the major product(s) of the following reaction.



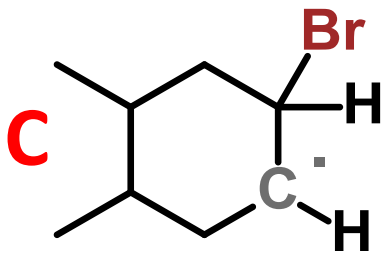
??

2016-09-07 Q1

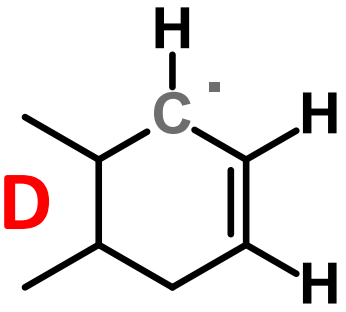
A HBr

B $Br^{\cdot}$ 1

C

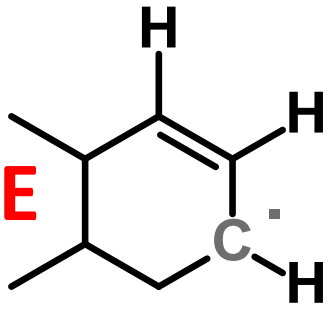


D



2

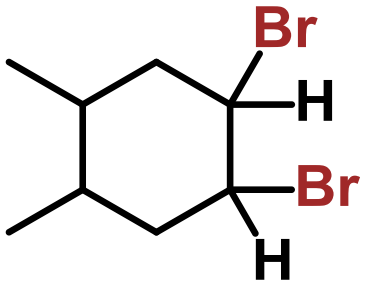
E



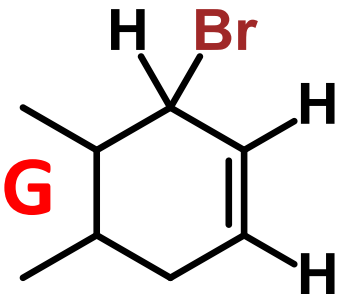
2

Answer = gh

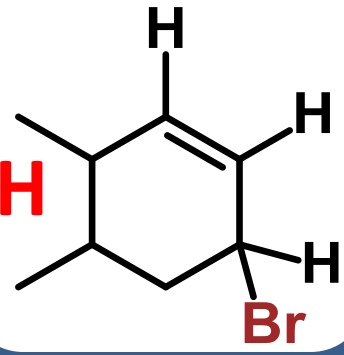
F



G



H



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 1H NMR Spectra (wDeadline)	Friday, August 26
5	B7-15-06 Number of Peaks 13C 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 13C 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 20, 21, 22**

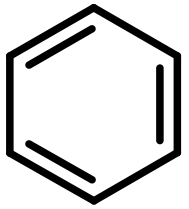
Exam 1

- **Time:**
  - **Tuesday, September 20: 7:00 – 9:00PM OR**
  - **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**

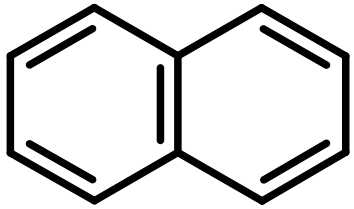
Criterion for Aromaticity

- Contains a magic number of π-electrons
  - 2, 6, 10, 14, 18, 22 π-electrons OR
  - (4n+2) π-electrons
- π-electrons must complete a full circle

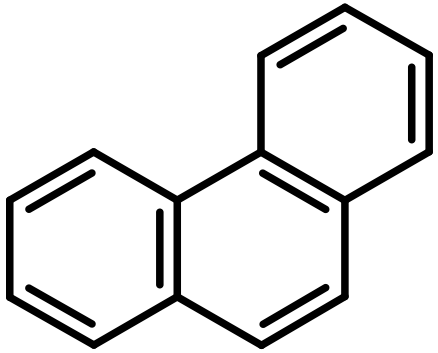
Stable!
Don't
React!



6 π-electrons



10 π-electrons

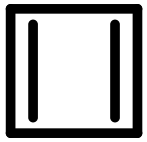


14 π-electrons

Criterion for Anti-Aromaticity

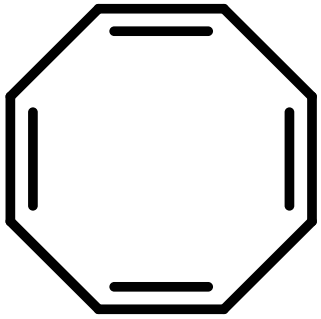
- Contains an anti-magic number of π-electrons
  - 4, 8, 12, 16, 20, 24 π-electrons OR
  - (4n) π-electrons
- π-electrons must complete a full circle

Unstable!



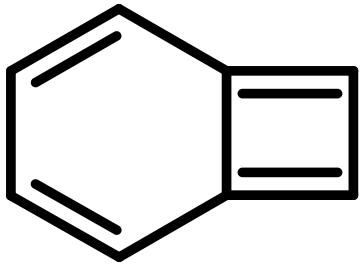
4 π-electrons

Reacts at 10 K with itself to avoid being anti-aromatic!



8 π-electrons

Is Non-planar to avoid anti-aromaticity!

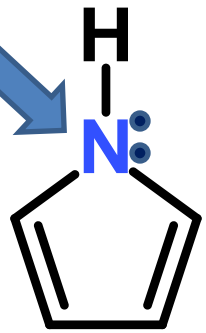


8 π-electrons

Unstable!

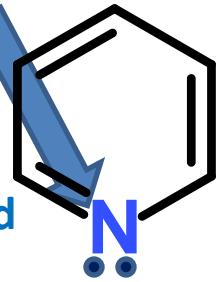
Which electrons to count?

Weak base: nitrogen electrons are busy playing with other electrons

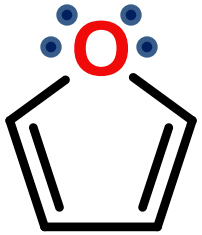


6 π-electrons

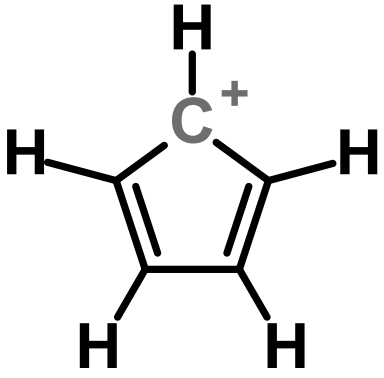
Strong base: nitrogen electrons are isolated by themselves



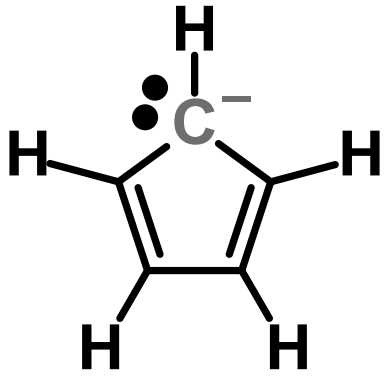
6 π-electrons



6 π-electrons

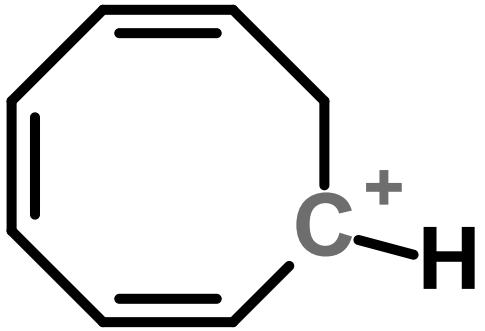


4 π-electrons



6 π-electrons

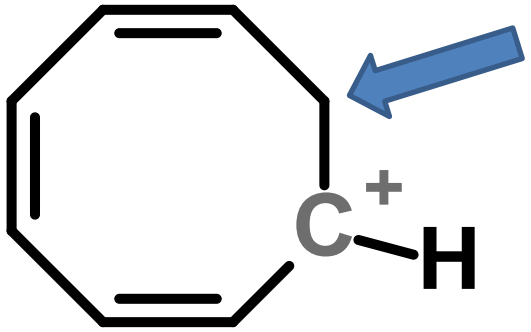
Classify the following compound.



A. Aromatic
B. Anti-aromatic
C. Neither aromatic nor anti-aromatic

2016-09-07 Q2

Classify the following compound.



CH_2 group stops the conjugation and there is not a complete circle of electrons

6 π-electrons

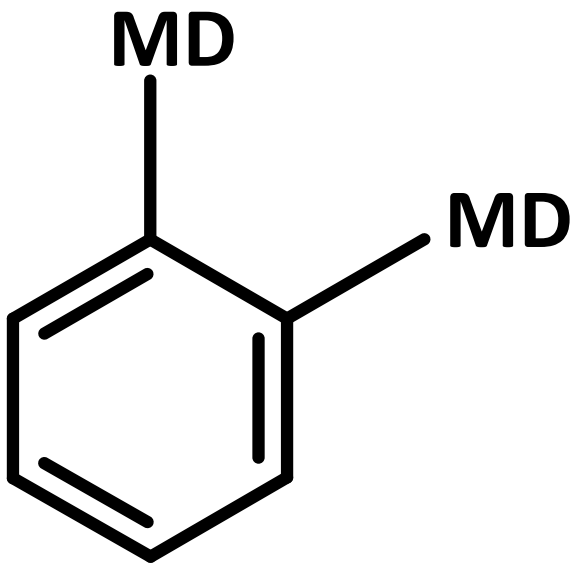
A. Aromatic

B. Anti-aromatic

C. Neither aromatic nor anti-aromatic

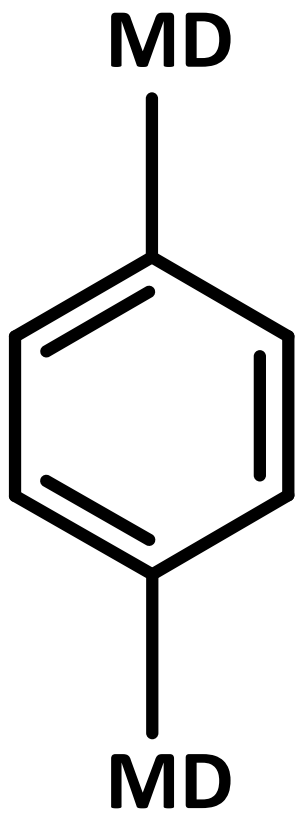
2016-09-07 Q2

What is the common name of the following compound?



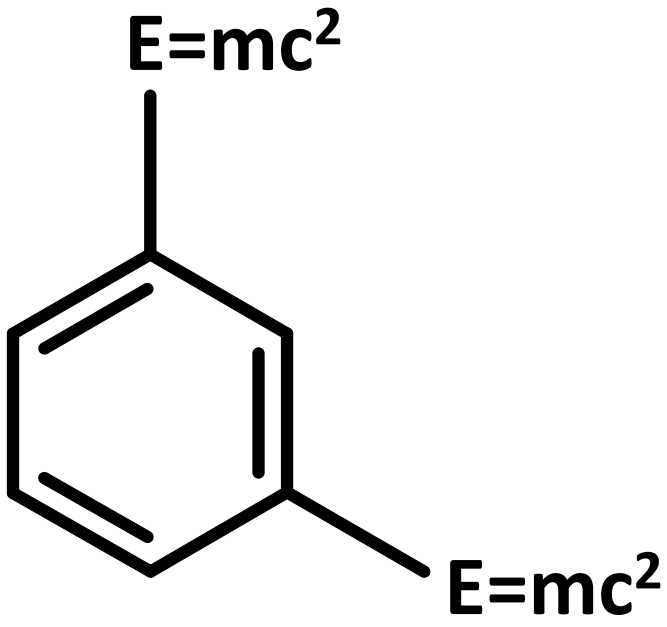
orthodox

What is the common name of the following compound?



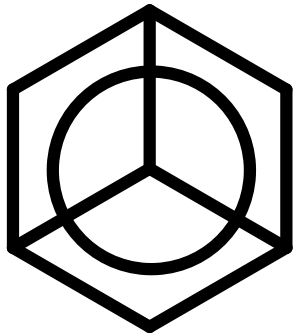
paradox

What is the common name of the following compound?



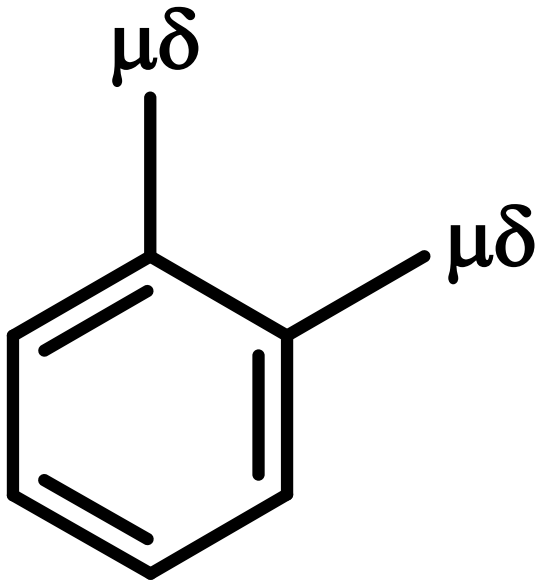
Meta-physics

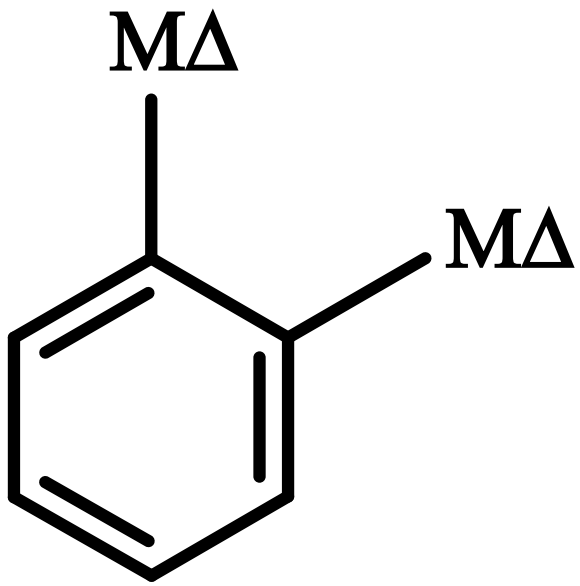
What is the common name of the following compound?



Mercedes benzene

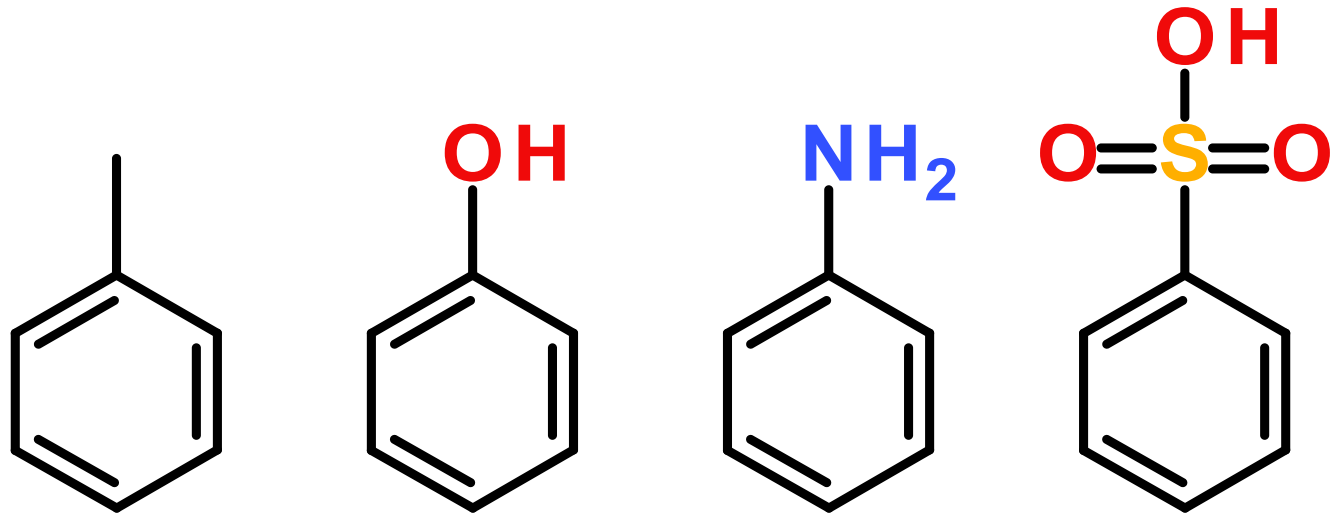
What is the common name of the following compound?





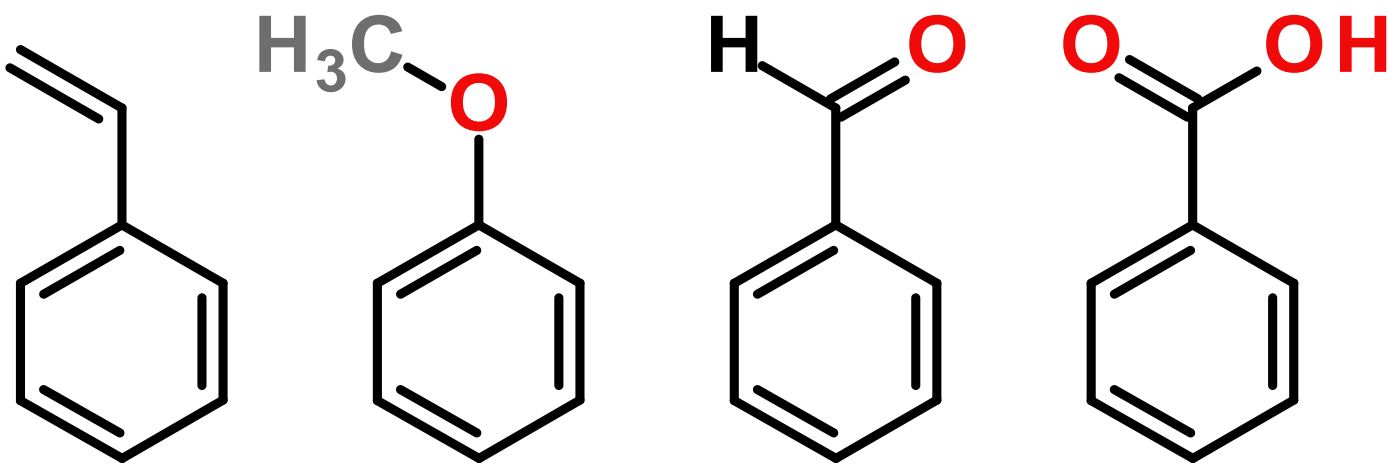
Greek orthodox

Base Names of Aromatic Compounds



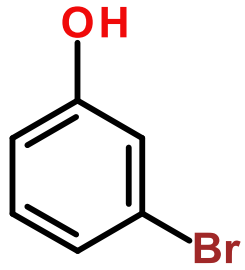
Toluene Phenol Aniline Benzenesulfonic Acid

Base Names of Aromatic Compounds



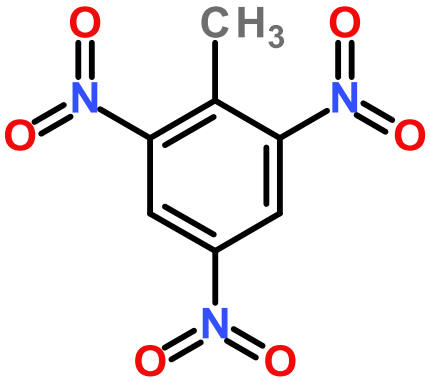
Styrene Anisole Benzaldehyde Benzoic Acid

Arene Nomenclature Examples



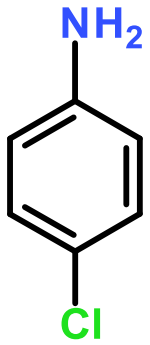
IUPAC Names: 3-bromophenol

Common Names: m-bromophenol



IUPAC Names: 2,4,6-trinitrotoluene

Common Names: TNT

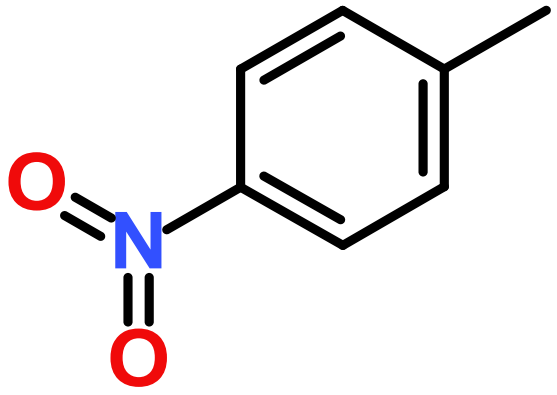


IUPAC Names: 4-chloroaniline

Common Names: p-chloroaniline

What is the common name of the following compound?

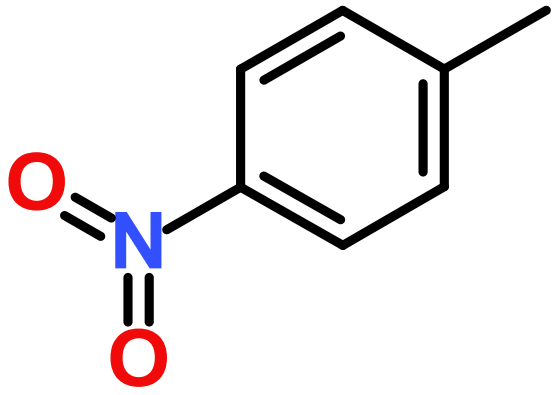
A. 2-nitrotoluene
B. 3-nitrotoluene
C. 4-nitrotoluene
D. *o*-nitrotoluene
E. *m*-nitrotoluene
F. *p*-nitrotoluene



2016-09-07 Q3

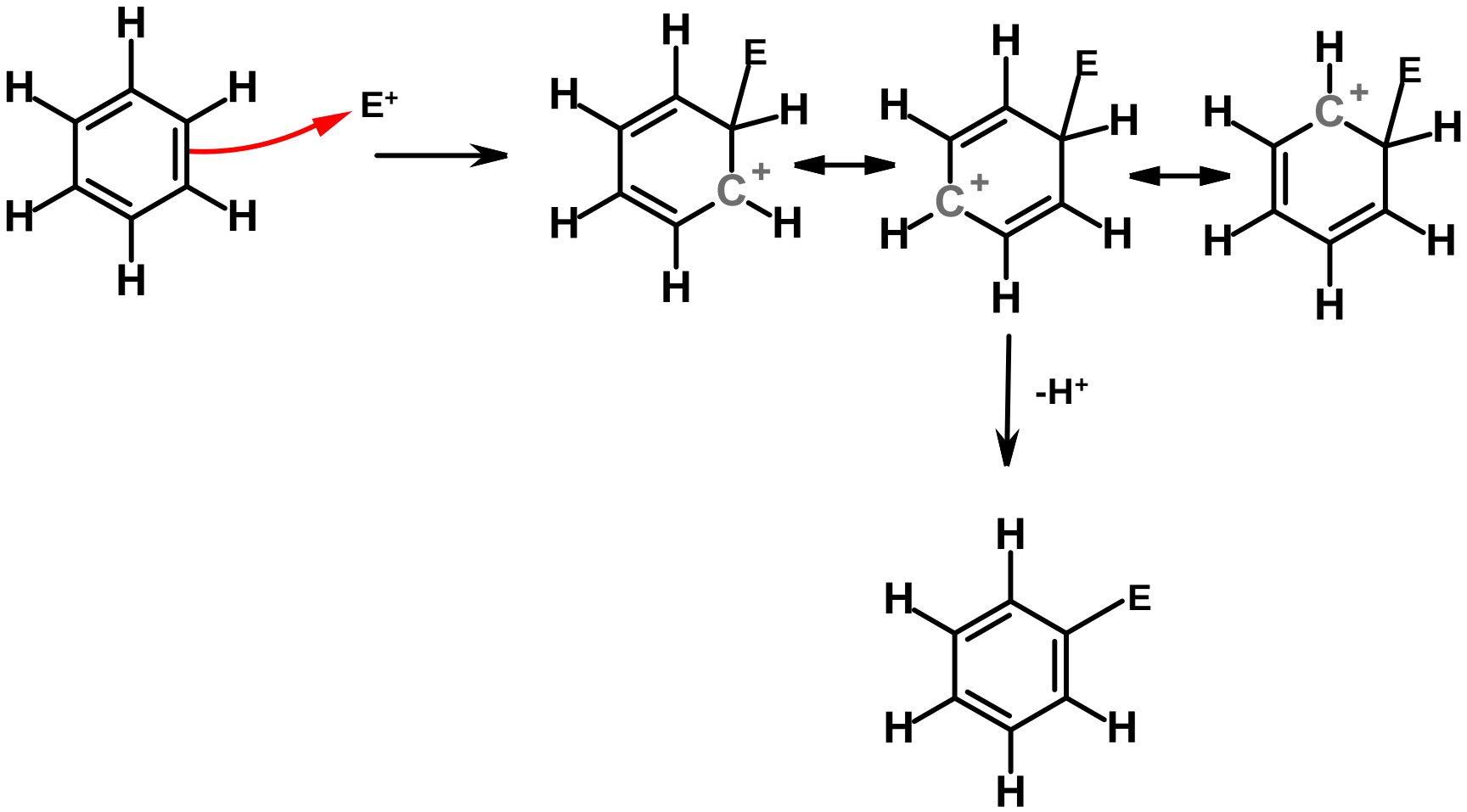
What is the common name of the following compound?

A. 2-nitrotoluene
B. 3-nitrotoluene
C. 4-nitrotoluene
D. *o*-nitrotoluene
E. *m*-nitrotoluene
F. *p*-nitrotoluene

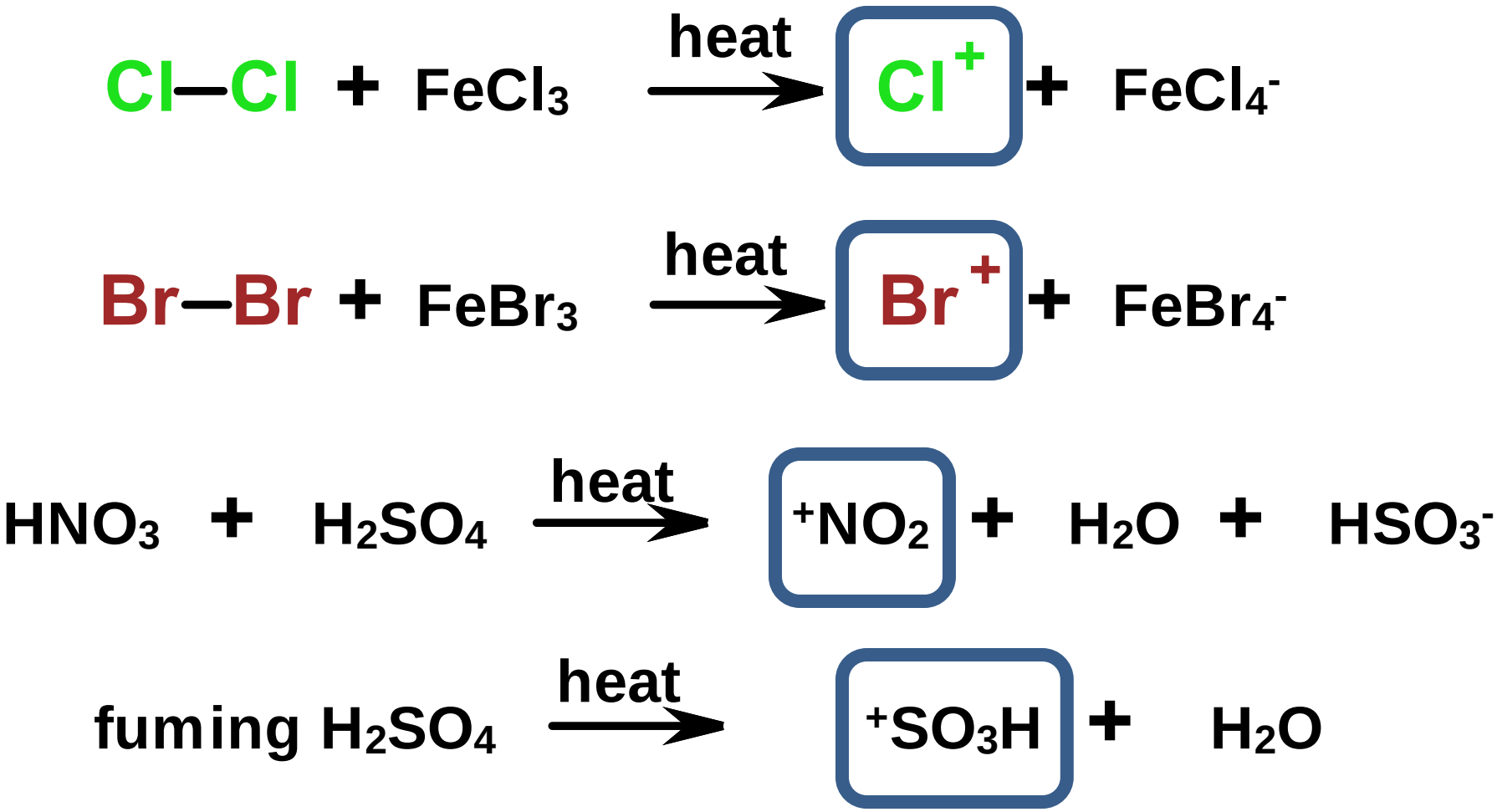


2016-09-07 Q3

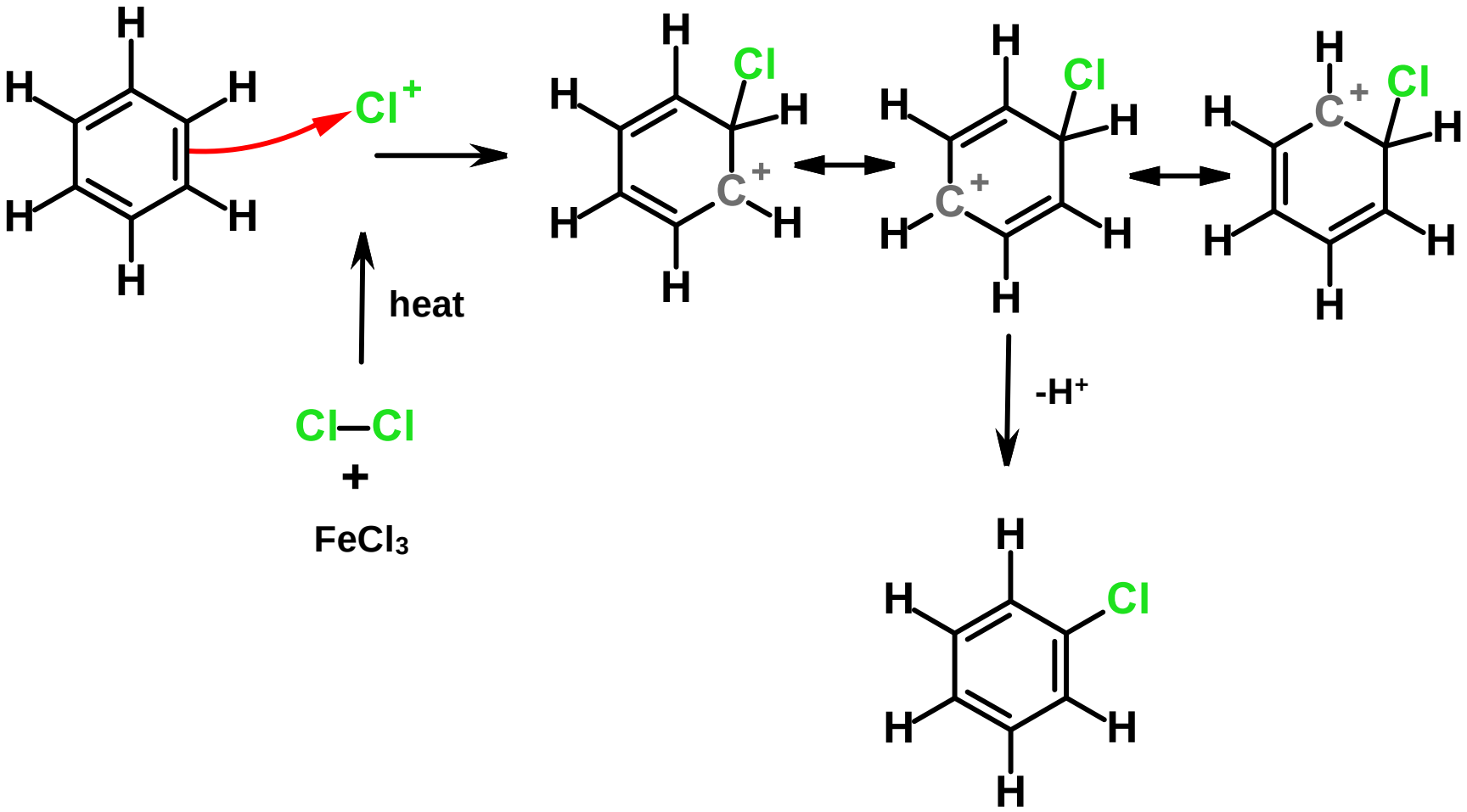
Mechanism of Electrophilic Aromatic Substitution



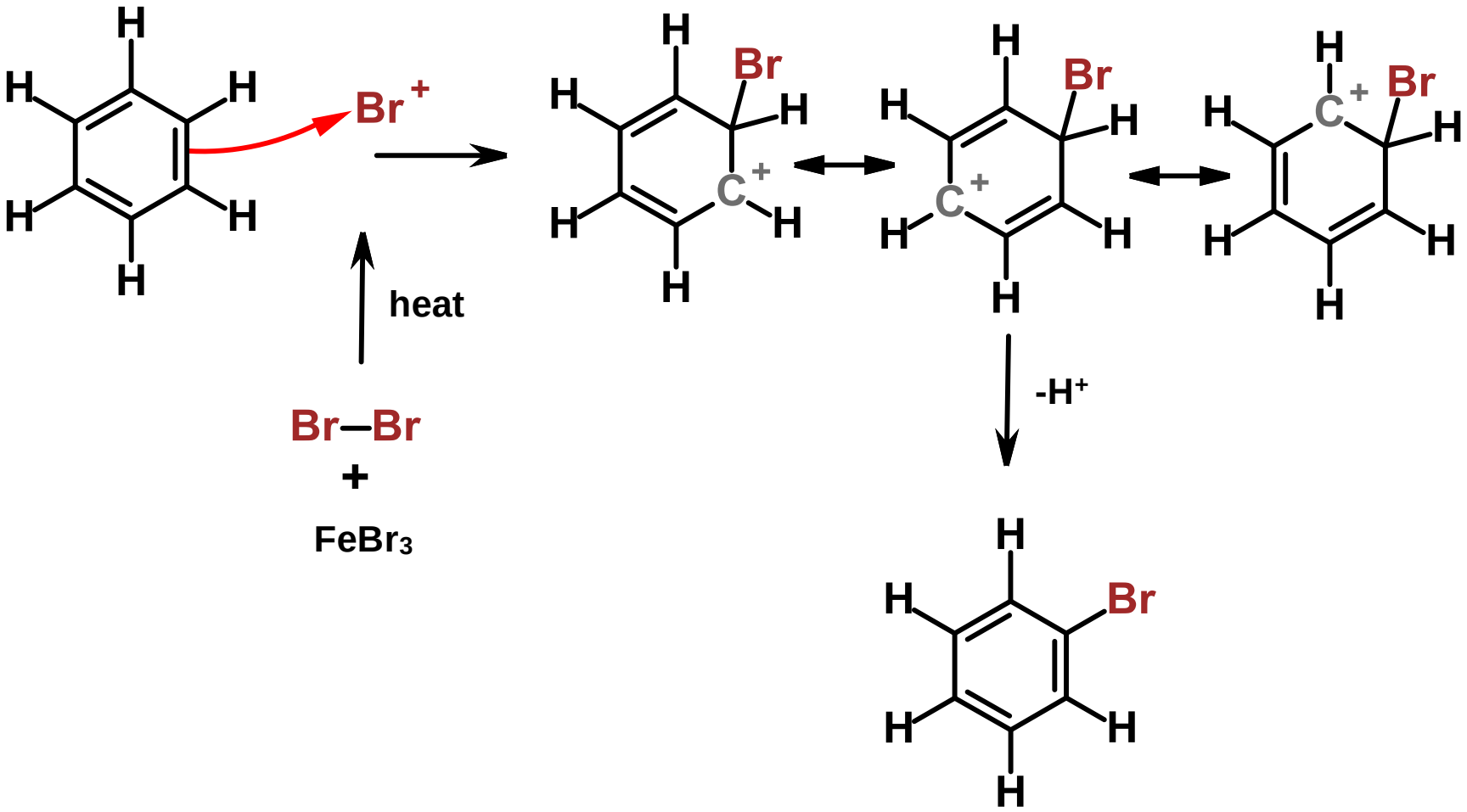
Generating E^+



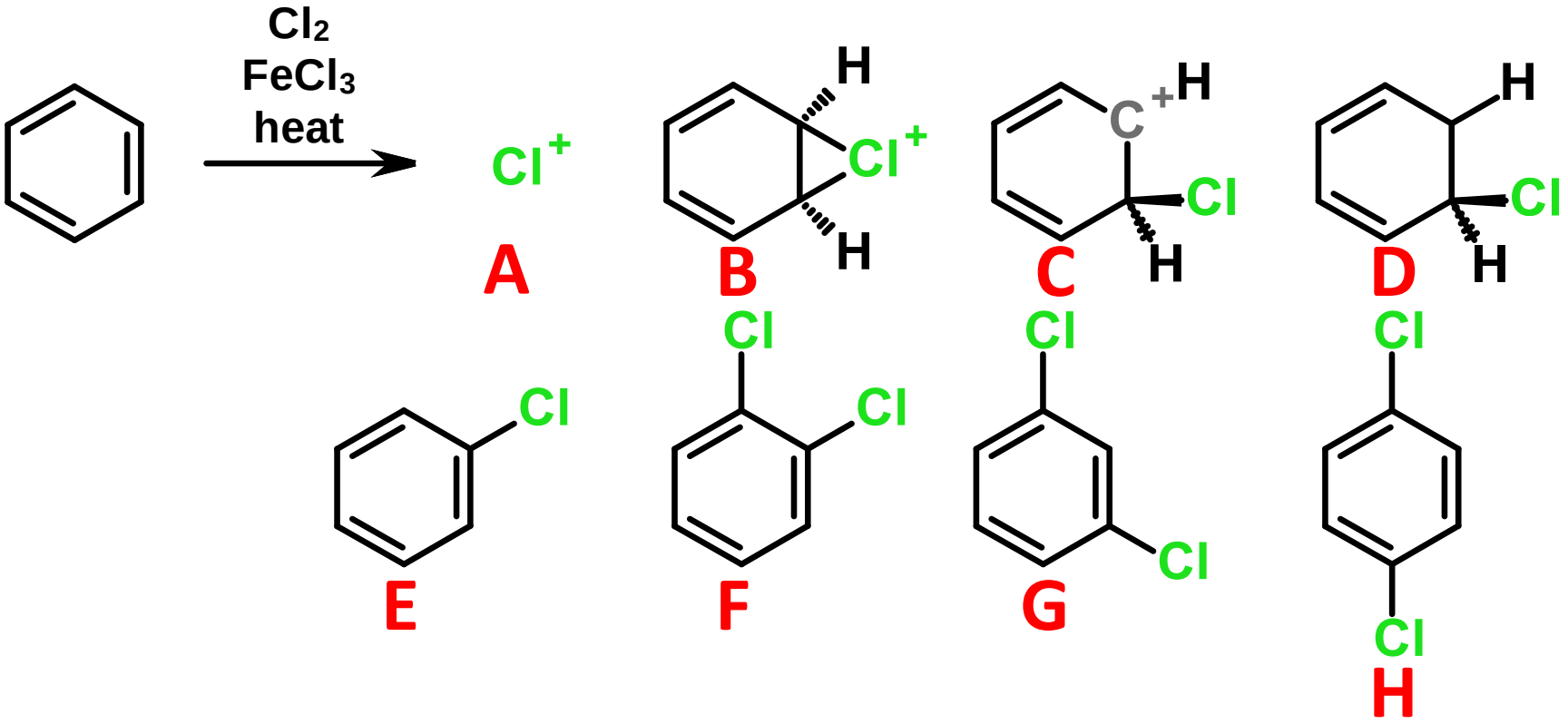
Mechanism of Electrophilic Aromatic Substitution



Mechanism of Electrophilic Aromatic Substitution

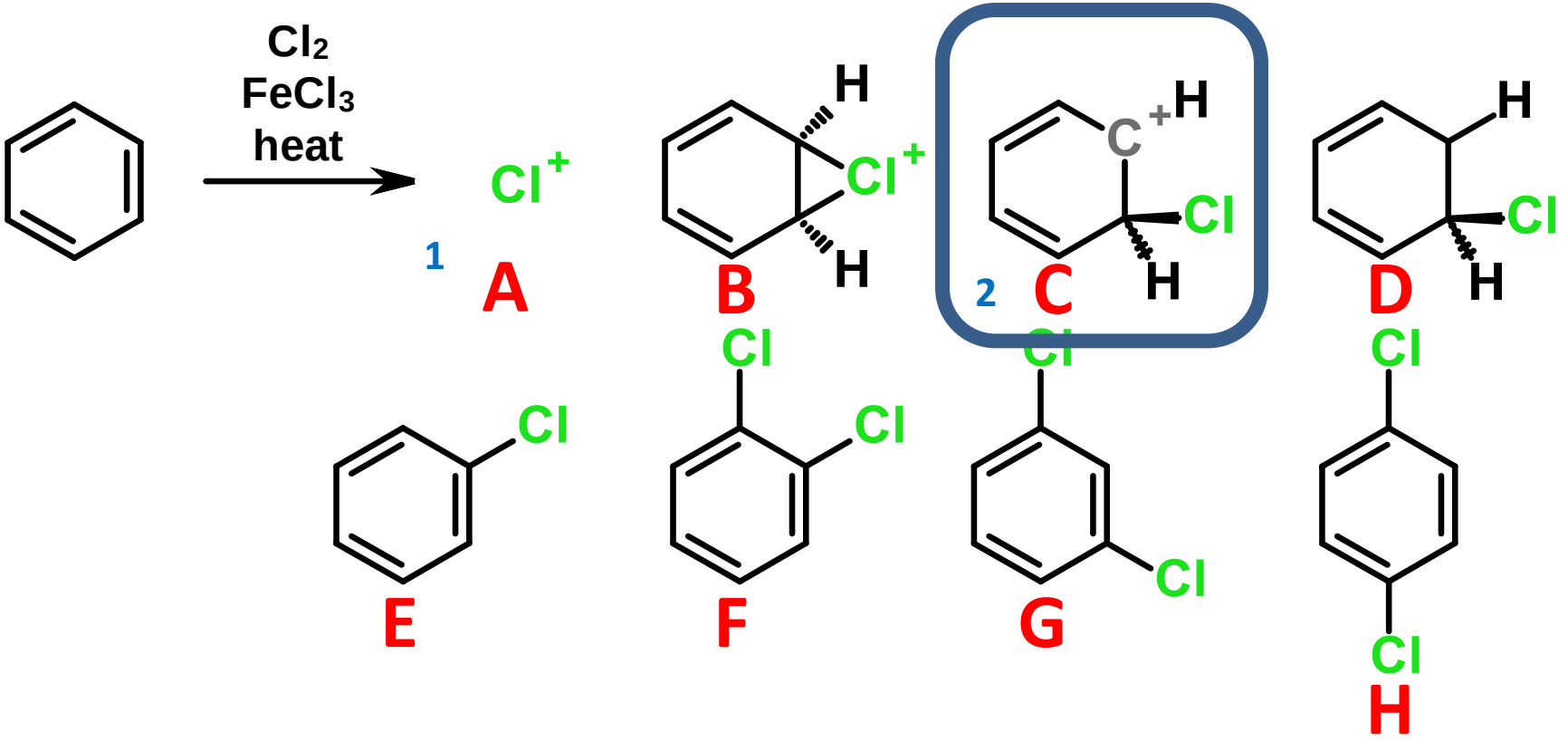


Give the next major organic intermediate(s) of the following reaction. Give your answer as a text answer. If more than one species is correct, put your answers in alphabetical order.



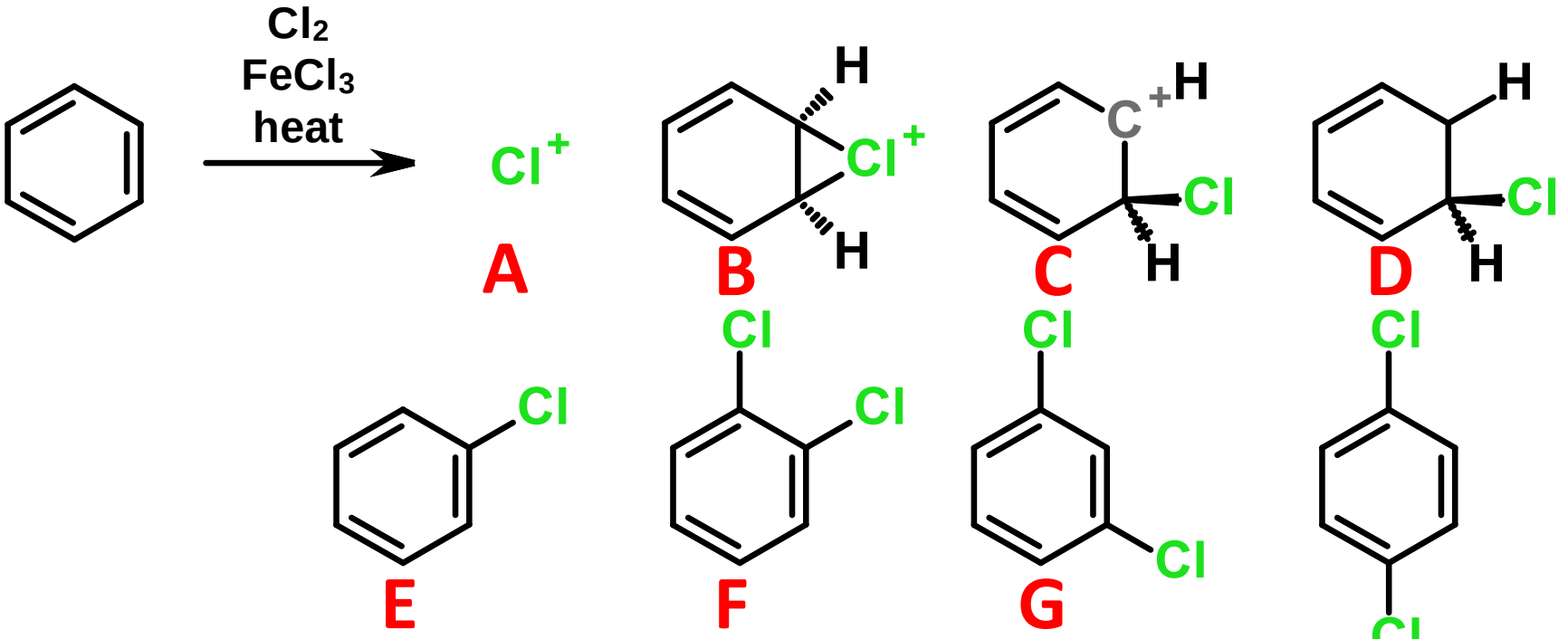
2016-09-07 Q4

Give the next major organic intermediate(s) of the following reaction. Give your answer as a text answer. If more than one species is correct, put your answers in alphabetical order.



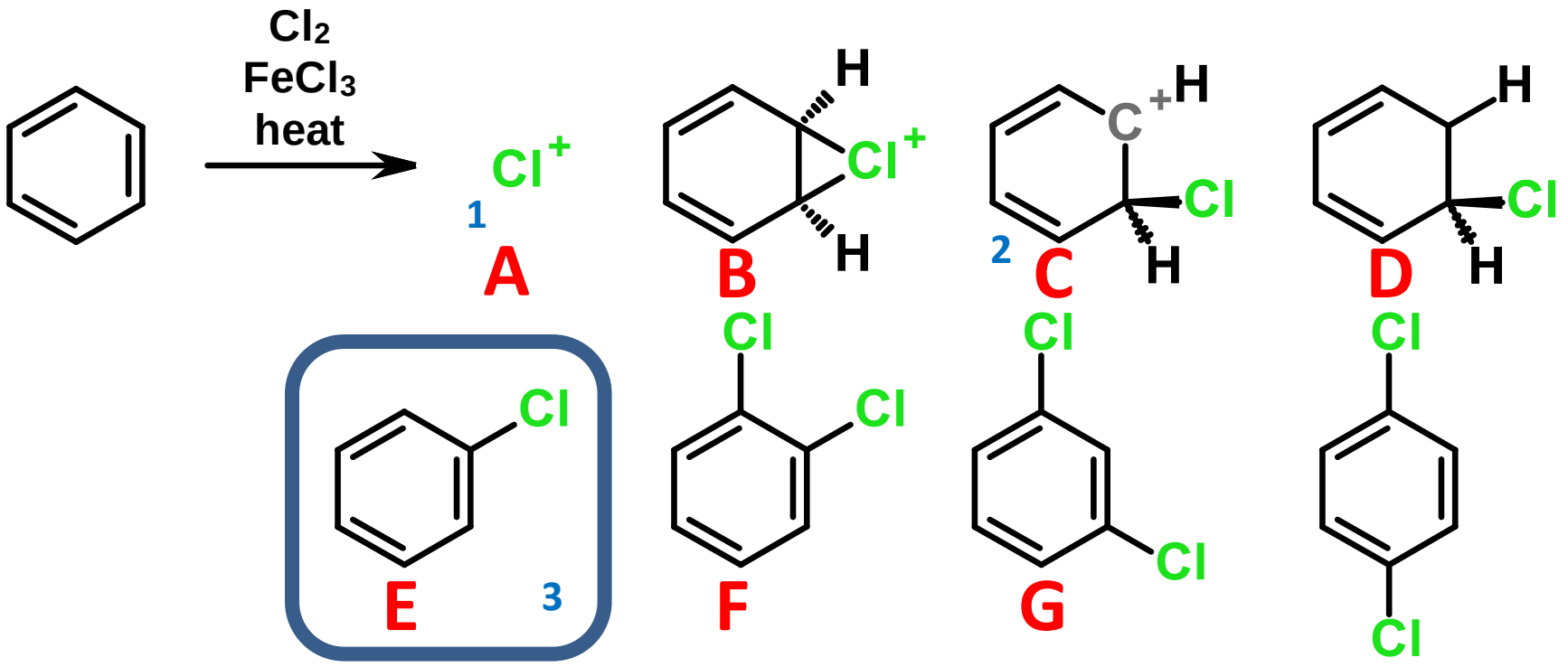
2016-09-07 Q4

Give the final product of the following reaction. Give your answer as a text answer. If more than one species is correct, put your answers in alphabetical order.



2016-09-07 Q5

Give the final product of the following reaction. Give your answer as a text answer. If more than one species is correct, put your answers in alphabetical order.



2016-09-07 Q5