Klein, Organic Chemistry 4e
Chapter 1

1. Chemical reactions occur as a result of_____

A. the attraction between opposite charges.
B. the nucleus–nucleus interactions.
C. the motion of electrons.
D. like atoms interacting.
E. combining two chemicals.

Answer: C
Learning Objective: 1.1 Compare and contrast organic and inorganic compounds
Difficulty: Easy

2. From the following, identify the item which does not contain organic compounds.

A. medicine
B. socks
C. a plant
D. a coin
E. a plastic cup

Answer: D
Learning Objective: 1.1 Compare and contrast organic and inorganic compounds
Difficulty: Easy

3. What is the difference between inorganic and organic compounds?

A. organic compounds do not contain carbon
B. organic compounds contain carbon
C. organic compounds are without pesticides
D. inorganic compounds contain carbon
E. inorganic compounds are composed exclusively of transition metal elements

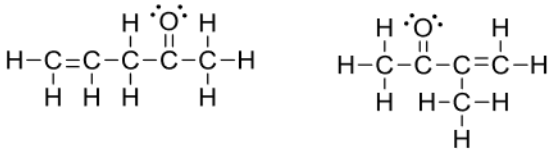
Answer: B
Learning Objective: 1.1 Compare and contrast organic and inorganic compounds
Difficulty: Easy

4. Constitutional isomers do not differ in_____.

A. physical properties
B. atomic connectivity
C. molecular formula
D. name
E. constitution

Answer: C
Learning Objective: 1.2 Describe structural theory of matter, molecular formula and structural formula
Difficulty: Easy

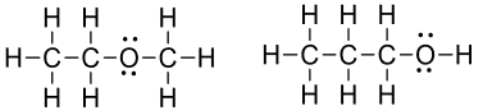
5. What is the relationship between the following compounds?



A. isotopes
B. constitutional isomers
C. the same structure
D. composed of different elements
E. no relationship

Answer: B
Learning Objective: 1.2 Describe structural theory of matter, molecular formula and structural formula
Difficulty: Easy

6. What is the relationship between the following compounds?



A. resonance isomers
B. constitutional isomers
C. empirical isomers
D. There is no relationship
E. isotopes

Answer: B
Learning Objective: 1.2 Describe structural theory of matter, molecular formula and structural formula

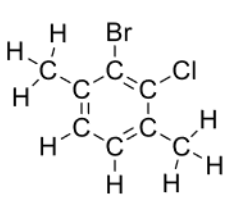
Difficulty: Easy

7. Carbon is considered to be_____.

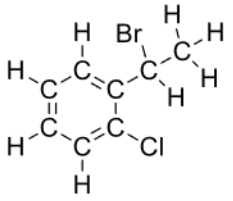
A. tetravalent
B. divalent
C. trivalent
D. monovalent
E. pentavalent

Answer: A
Learning Objective: 1.2 Describe structural theory of matter, molecular formula and structural formula
Difficulty: Easy

8. Which of the following compounds are constitutional isomers of each other?



I



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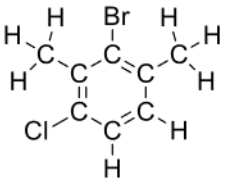

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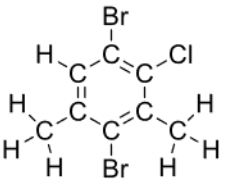


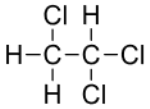
IV

A. I and II
B. III and IV
C. I, II and IV
D. II, III and IV
E. I, II, and III

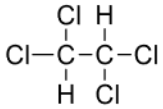
Answer: E

Learning Objective: 1.2 Describe structural theory of matter, molecular formula and structural formula
Difficulty: Medium

9. Which of the following compounds are constitutional isomers of each other?



I



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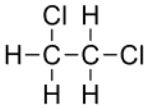

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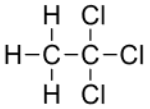
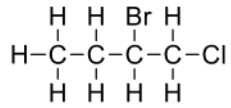


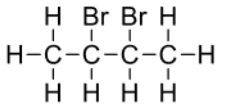
IV

A. I and II
B. II and III
C. III and IV
D. I and IV
E. II and III

Answer: D
Learning Objective: 1.2 Describe structural theory of matter, molecular formula and structural formula
Difficulty: Medium

10. Identify three constitutional isomers having the molecular formula C_4H_8BrCl


I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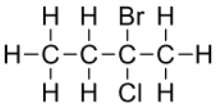
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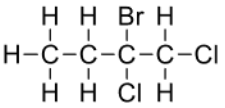
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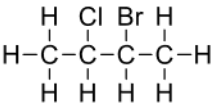
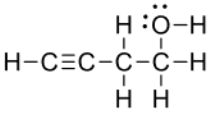
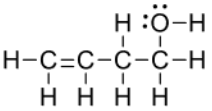

V

A. I, II, and III
B. II, III, and IV
C. III, IV, and V
D. I, III, and IV
E. II, III, and V

Answer: D
Learning Objective: 1.2 Describe structural theory of matter, molecular formula and structural formula
Difficulty: Medium

11. Identify three constitutional isomers having the molecular formula C_4H_8O.


I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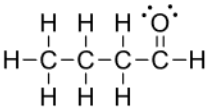
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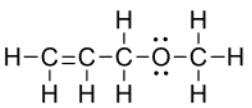
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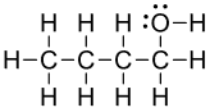

V

A. I, II, and III
B. II, III, and IV
C. III, IV, and V
D. I, II, and IV
E. II, III, and V

Answer: B

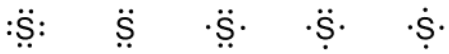
Learning Objective: 1.2 Describe structural theory of matter, molecular formula and structural formula
Difficulty: Medium

12. What force is NOT considered in the formation of a covalent bond?

A. repulsion between two positively charged nuclei
B. force of attraction between positively charged nuclei and negatively charged electrons
C. repulsion between negatively charged electrons
D. repulsion between positively charged nuclei and negatively charged electrons
E. the distance between the atoms' nuclei

Answer: D
Learning Objective: 1.3 Define covalent bond, valence electrons, octet rule, and lone pair
Difficulty: Easy

13. What is the correct Lewis dot structure for the sulfur atom, S?

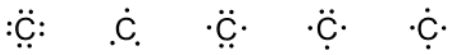


I II III IV V

A. I
B. II
C. III
D. IV
E. V

Answer: C
Learning Objective: 1.3 Define covalent bond, valence electrons, octet rule, and lone pair
Difficulty: Easy

14. What is the correct Lewis dot structure for the carbon atom, C?



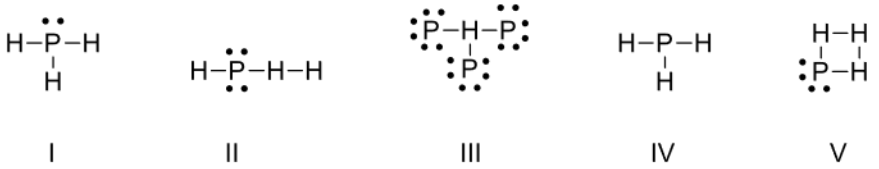
I II II IV V

A. I
B. II
C. III
D. IV
E. V

Answer: E
Learning Objective: 1.3 Define covalent bond, valence electrons, octet rule, and lone pair
Difficulty: Easy

15. What is the correct Lewis structure for the molecule shown in the box below?

PH_3



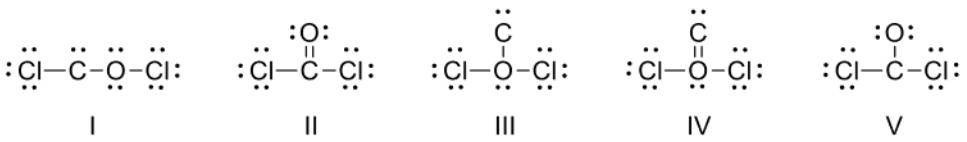
I II III IV V

A. I
B. II
C. III
D. IV
E. V

Answer: A
Learning Objective: 1.3 Define covalent bond, valence electrons, octet rule, and lone pair
Difficulty: Easy

16. What is the correct Lewis structure for the molecule shown in the box below?

$COCl_2$



I II III IV V

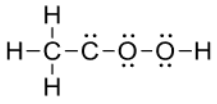
A. I
B. II
C. III
D. IV
E. V

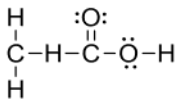
Answer: B

Learning Objective: 1.3 Define covalent bond, valence electrons, octet rule, and lone pair
Difficulty: Medium

17. What is the correct Lewis structure for the molecule shown in the box below?

CH_3CO_2H


I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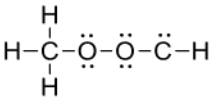
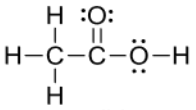
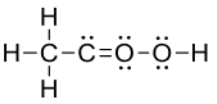

III


IV


V

A. I
B. II
C. III
D. IV
E. V

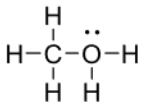
Answer: D
Learning Objective: 1.3 Define covalent bond, valence electrons, octet rule, and lone pair
Difficulty: Medium

18. Which of the following compounds has two lone pairs on the central atom?

A. CO_2
B. SCl_2
C. NF_3
D. CS_2
E. SO_3

Answer: B
Learning Objective: 1.3 Define covalent bond, valence electrons, octet rule, and lone pair
Difficulty: Medium

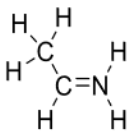
19. What is the formal charge on oxygen in the following structure?



A. 2-
B. 1-
C. 2+
D. 1+
E. 0

Answer: D
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Easy

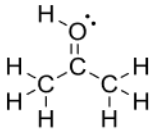
20. What is the formal charge on nitrogen in the following structure?



A. 2-
B. 1-
C. 2+
D. 1+
E. 0

Answer: D
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Easy

21. What is the formal charge on oxygen in the following structure?

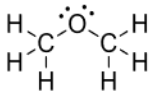


A. 0
B. 1+
C. 2+
D. 1-
E. 2-

Answer: B
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated

Difficulty: Easy

22. What is the formal charge on oxygen in the following structure?



A. 2+
B. 2-
C. 1+
D. 1-
E. 0

Answer: E
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Easy

23. Which of the following structures have a formal charge of zero on the carbon atom?

I

II

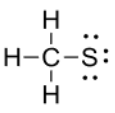
III

IV

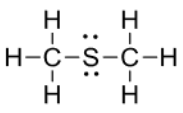
A. I and III
B. II and III
C. III and IV
D. I and IV
E. II and IV

Answer: C
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Medium

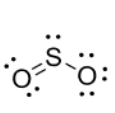
24. Which of the following structures have a 1- formal charge on the sulfur atom?



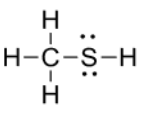
I



II



III



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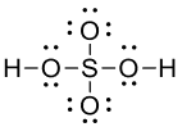
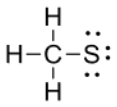


V

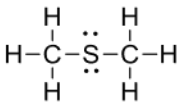
A. I
B. II
C. III
D. IV
E. V

Answer: A
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Easy

25. Which of the following structures have a 1+ formal charge on the sulfur atom?



I



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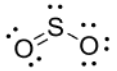

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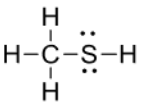

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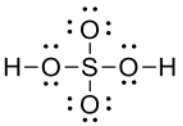
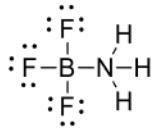


V

A. I
B. II
C. III
D. IV
E. V

Answer: C
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Easy

26. What are the formal charges on boron and nitrogen in the following structure?

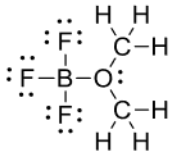


A. B = 1+, N = 1+
B. B = 1+, N = 1-
C. B = 1-, N = 1-
D. B = 1-, N = 1+
E. B = 1-, N = 0

Answer: D

Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Medium

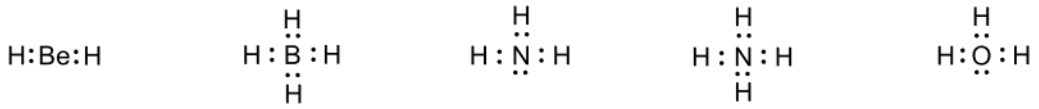
27. What are the formal charges on boron and oxygen in the following structure?



A. B = 1-, O = 1-
B. B = 1-, O = 1+
C. B = 1+, O = 1+
D. B = 1+, O = 1-
E. B = 1-, O = 0

Answer: B
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Medium

28. Which of the following structures have 1+ formal charge on the central atom?



I II III IV V

A. I
B. II
C. III
D. III and V
E. IV and V

Answer: E
Learning Objective: 1.4 Define formal charge and describe how formal charge is calculated
Difficulty: Medium

29. Which of the following structures have a formal charge on at least one atom?