Pool Canvas

Add, modify, and remove questions. Select a question type from the Add Question drop-down list and click **Go** to add questions. Use Creation Settings to establish which default options, such as feedback and images, are available for question creation.

Add Calculated Formula GO | Creation Settings

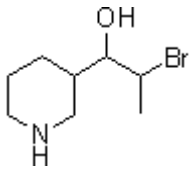
Name Chapter 1: Structure and Bonding
Description Question pool for Chapter 1: Structure and Bonding
Instructions

Modify

Add Question Here

Question 1 **Multiple Choice** **0 points** Modify Remove

Question
Which is the most electronegative atom in the compound below?



Answer
- Carbon
- Nitrogen
- ✓ Oxygen
- Bromine

Add Question Here

Question 2 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following correctly describes the electrons of a carbon atom in its ground state?

Answer
- 3 *s* electrons; 3 *p* electrons
- 2 1*s* electrons; 4 2*p* electrons
- ✓ 2 1*s* electrons; 2 2*s* electrons; 2 2*p* electrons
- 2 1*s* electrons; 2 2*s* electrons; 4 2*p* electrons
- None of these choices is correct.

Add Question Here

Question 3 **Multiple Choice** **0 points** Modify Remove

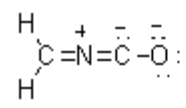
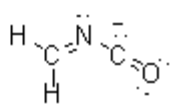
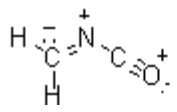
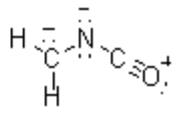
Question
Which of the following statements correctly describes the typical bonding of carbon, nitrogen, and oxygen in organic molecules?

Answer
- Carbon participates in 4 covalent bonds, oxygen participates in 2 covalent bonds and nitrogen participates in 5 covalent bonds.
- Carbon participates in 3 covalent bonds, oxygen participates in 2 covalent bonds and nitrogen participates in 5 covalent bonds.
- Carbon participates in 4 covalent bonds, oxygen participates in 3 covalent bonds and nitrogen participates in 3 covalent bonds.
- Carbon participates in 3 covalent bonds, oxygen participates in 3 covalent bonds and nitrogen participates in 5 covalent bonds.
- ✓ Carbon participates in 4 covalent bonds, oxygen participates in 2 covalent bonds and nitrogen participates in 3 covalent bonds.

Add Question Here

Question 4 **Multiple Choice** **0 points** Modify Remove

Question
Which is *not* an acceptable Lewis structure for the anion $(CH_2NCO)^-$?

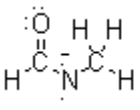
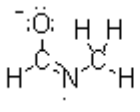
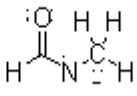
a.  **b.**  **c.**  **d.** 

Answer
- a
- b
- ✓ c
- d

Add Question Here

Question 5 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following is (are) valid Lewis structure(s) for the anion $(HCONCH_3)^-$?

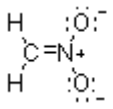
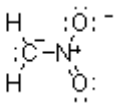
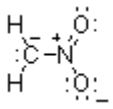
a.  **b.**  **c.**  **d.** a and b **e.** a, b, and c

Answer
- a
- b
- c
- ✓ d
- e

Add Question Here

Question 6 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following is (are) valid Lewis structure(s) for the anion $(CH_2NO_2)^-$? Assume the atoms are arranged as drawn.

a.  **b.**  **c.**  **d.** a and b **e.** a, b, and c

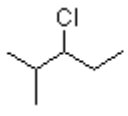
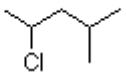
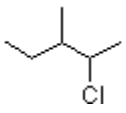
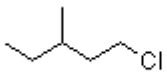
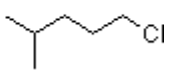
Answer

a
b
c
d
✓ e

Add Question Here

Question 7 **Multiple Choice** **0 points** Modify Remove

Question
Which is the appropriate conversion of $CH_3CHClCH_2CH(CH_3)_2$ to a skeletal formula?

a.  **b.**  **c.**  **d.**  **e.** 

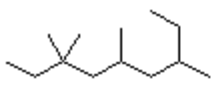
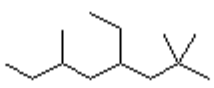
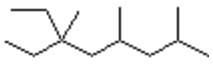
Answer

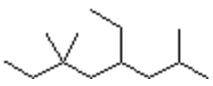
a
✓ b
c
d
e

Add Question Here

Question 8 **Multiple Choice** **0 points** Modify Remove

Question
Convert the following compound from a condensed formula to a skeletal formula:
$CH_3CH_2C(CH_3)_2CH_2CH(CH_2CH_3)CH_2CH(CH_3)_2$.

a.  **b.**  **c.** 

d.  **e.** None of the choices is correct.

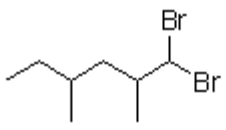
Answer

a
b
c
✓ d
e

Add Question Here

Question 9 **Multiple Choice** **0 points** Modify Remove

Question
What is the condensed formula of the compound below?



a. $CH_3CH_2CH(CH_3)CH_2CH(CH_3)CHBr_2$

b. $CH_3CH_2CH_2(CH_3)CH_2CH(CH_3)CHBr_2$

c. $CH_3CH_2CH(CH_3)CH(CH_3)CH_2CHBr_2$

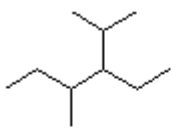
Answer

✓ a
b
c

Add Question Here

Question 10 **Multiple Choice** **0 points** Modify Remove

Question
Convert the following skeletal formula to a condensed formula.



a. $CH_3CH_2CH(CH_3)_2CH(CH_2CH_3)CH(CH_3)_2$

b. $CH_3CH_2CH(CH_3)CH(CH_2CH_3)CH(CH_3)_2$

c. $CH_3CH(CH_3)CH(CH_2CH_3)CH(CH_3)_2$

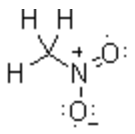
Answer

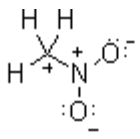
a
✓ b
c

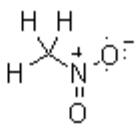
Add Question Here

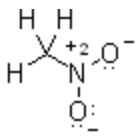
Question 11 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following is *not* a valid Lewis structure of CH_3NO_2?

a. 

b. 

c. 

d. 

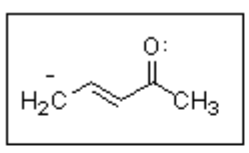
Answer

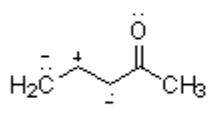
a
✓ b
c
d

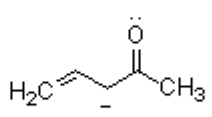
Add Question Here

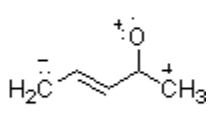
Question 12 **Multiple Choice** **0 points** Modify Remove

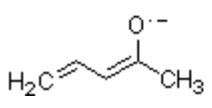
Question
Which is *not* a valid resonance structure for the anion below?



a 

b. 

c. 

d. 

e. All are valid resonance structures.

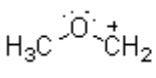
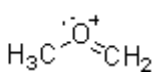
Answer

a
b
✓ c
d
e

Add Question Here

Question 13 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

 and 

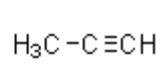
Answer

They are constitutional isomers.
✓ They are resonance structures.
They represent the same structure.

Add Question Here

Question 14 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

 and 

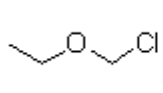
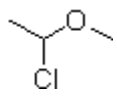
Answer

✓ They are constitutional isomers.
They are resonance structures.
Neither of the choices is correct.

Add Question Here

Question 15 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

 and 

Answer

✓ They are constitutional isomers.
They are resonance structures.
Neither of the choices is correct.

Add Question Here

Question 16 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

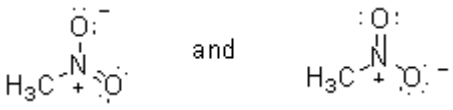
 and 

Answer
They are constitutional isomers.
They are resonance structures.
✓ They are unrelated molecules.

Add Question Here

Question 17 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

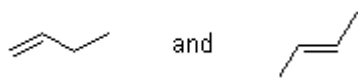


Answer
They are constitutional isomers.
✓ They are resonance structures.
Neither of the choices is correct.

Add Question Here

Question 18 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

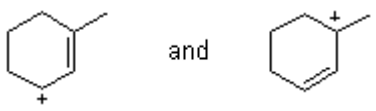


Answer
✓ They are constitutional isomers.
They are resonance structures.
Neither of the choices is correct.

Add Question Here

Question 19 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

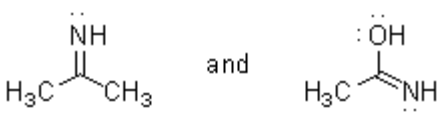


Answer
They are constitutional isomers.
✓ They are resonance structures.
Neither of the choices is correct.

Add Question Here

Question 20 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

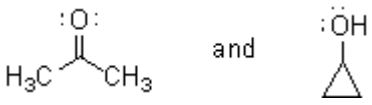


Answer
They are constitutional isomers.
They are resonance structures.
✓ They are unrelated molecules.

Add Question Here

Question 21 **Multiple Choice** **0 points** Modify Remove

Question
How are the molecules in the following pair related?

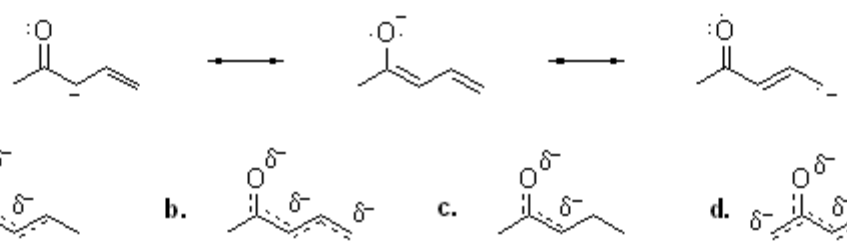


Answer
✓ They are constitutional isomers.
They are resonance structures.
Neither of the choices is correct.

Add Question Here

Question 22 **Multiple Choice** **0 points** Modify Remove

Question
Which is the most accurate representation of the resonance hybrid for the resonance structures shown below?



e. None of the choices is correct.

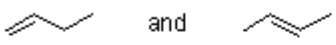
Answer
a
✓ b
c

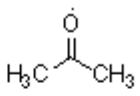
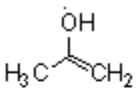
d
e

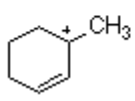
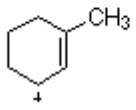
Add Question Here

Question 23 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following pairs of compounds are resonance structures?

a.  and

b.  and 

c.  and 

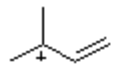
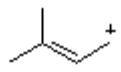
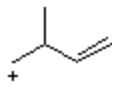
Answer

a
✓ b
c

Add Question Here

Question 24 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following structures are resonance structures of each other?

a.  **b.**  **c.** 

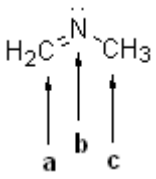
Answer

✓ a and b
b and c
a and c
All are resonance structures.
None of these are resonance structures.

Add Question Here

Question 25 **Multiple Choice** **0 points** Modify Remove

Question
What is the hybridization for each of the indicated atoms in the following compound?



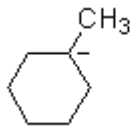
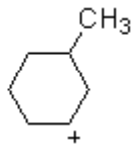
Answer

a - sp^2; **b** - sp^2; **c** - sp^2
a - sp^2; **b** - sp^3; **c** - sp^3
a - sp; **b** - sp^2; **c** - sp^3
✓ **a** - sp^2; **b** - sp^2; **c** - sp^3

Add Question Here

Question 26 **Multiple Choice** **0 points** Modify Remove

Question
Indicate the hybridization of the carbon ion in each compound below.

a.  **b.** 

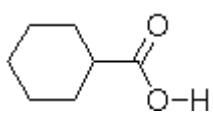
Answer

a - sp^2; **b** - sp^2
a - sp^2; **b** - sp^3
a - sp^3; **b** - sp^3
✓ **a** - sp^3; **b** - sp^2

Add Question Here

Question 27 **Multiple Choice** **0 points** Modify Remove

Question
Consider the organic molecule drawn below. Describe which orbitals are used to form the C=O bond. Since there are two bonds, you must identify two different sets of orbitals.



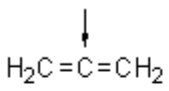
Answer

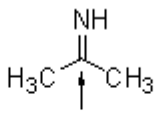
$C_{sp^2} - O_{sp^2}$ and $C_s - O_p$
$C_{sp} - O_{sp}$ and $C_p - O_p$
$C_{sp^2} - O_{sp^2}$ and $C_s - O_s$
$C_{sp^3} - O_{sp^2}$ and $C_p - O_p$
✓ $C_{sp^2} - O_{sp^2}$ and $C_{2p} - O_{2p}$

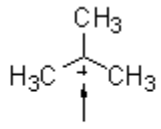
Add Question Here

Question 28 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following compounds has a labeled carbon atom that is sp^2 hybridized?

a. 

b. 

c. 

d. Compounds **b** and **c**

e. **a**, **b** and **c** all have sp^3 hybridized carbon.

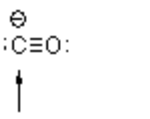
Answer

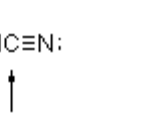
a
b
c
✓ d
e

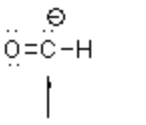
Add Question Here

Question 29 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following compounds contains a labeled atom that is *sp* hybridized? (All nonbonded electron pairs have been drawn in.)

a. 

b. 

c. 

d. **a** and **b**

e. **a**, **b** and **c**

Answer

a
b
c
✓ d
e

Add Question Here

Question 30 **Multiple Choice** **0 points** Modify Remove

Question
Which of the compounds drawn below contains an sp^2 hybridized carbon atom? Select any and all structures that apply.

a. CO_2 **b.** $H_2C=O$ **c.** CH_3^+ **d.** CH_3OH

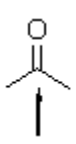
Answer

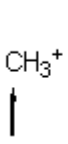
a only
b only
d only
a and b
✓ b and c

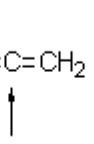
Add Question Here

Question 31 **Multiple Choice** **0 points** Modify Remove

Question
Which of the labeled carbon atoms is (are) sp^2 hybridized?

a. 

b. 

c. 

d. **a** and **b**

e. **a**, **b** and **c**

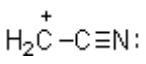
Answer

a
b
c
✓ d
e

Add Question Here

Question 32 **Multiple Choice** **0 points** Modify Remove

Question
Which statement best describes the orbital hybridization used to form bonds in the cation below?



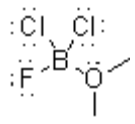
Answer

The σ bond between the two carbon atoms is formed between two sp^2 hybridized atoms.
The σ bond between the C and N is formed between an sp^2 hybridized C and an *sp* hybridized N.
The σ bond between the two carbons is formed between one sp^3 hybridized C and one *sp* hybridized C.
✓ The lone pair of electrons on N is in an *sp* hybridized orbital.
None of the statements is correct.

Add Question Here

Question 33 **Multiple Choice** **0 points** Modify Remove

Question
Indicate the formal charge on the B, O, and F atoms in the following compound.



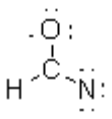
Answer

B: +1; O: +1; F: 0
B: –1; O: –1; F: 0
B: +1; O: –1; F: 0
✓ B: –1; O: +1; F: 0
None of the choices is correct.

Add Question Here

Question 34 **Multiple Choice** **0 points** Modify Remove

Question
In the following compound, indicate the formal charge on all atoms except hydrogen.



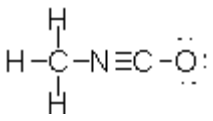
Answer

Carbon +1; Oxygen +1; Nitrogen –2
Carbon –1; Oxygen +1; Nitrogen –2
✓ Carbon +1; Oxygen –1; Nitrogen –2
Carbon +1; Oxygen –1; Nitrogen –1
None of the choices is correct.

Add Question Here

Question 35 **Multiple Choice** **0 points** Modify Remove

Question
In the following compound, indicate the formal charge on all atoms except hydrogen, from left to right.



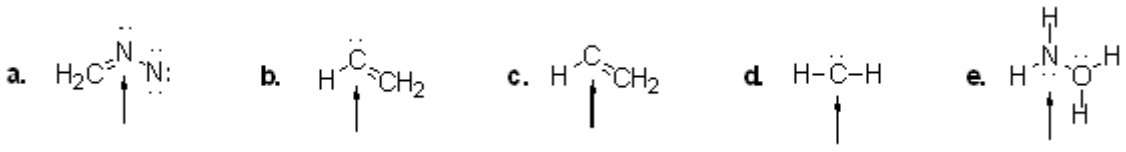
Answer

Carbon 0; Nitrogen –1; Carbon +1; Oxygen 0
Carbon –0; Nitrogen –1; Carbon 0; Oxygen –1
Carbon 0; Nitrogen –1; Carbon 0; Oxygen –1
✓ Carbon 0; Nitrogen +1; Carbon 0; Oxygen –1
None of the choices is correct.

Add Question Here

Question 36 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following compounds has a labeled atom with a +1 formal charge? (All nonbonded electron pairs have been drawn in.)



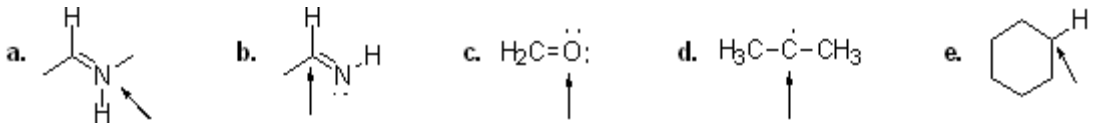
Answer

a
b
✓ c
d
e

Add Question Here

Question 37 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following species has a labeled atom with a +1 formal charge? (All nonbonded electron pairs have been drawn in.)



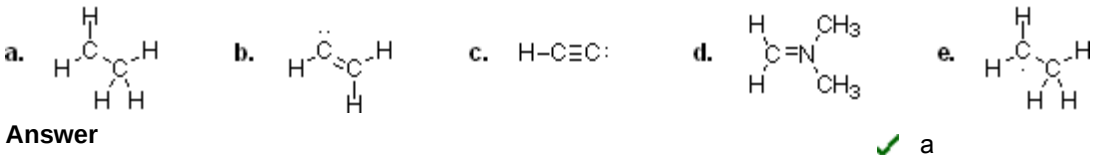
Answer

✓ a
b
c
d
e

Add Question Here

Question 38 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following species contains a carbon atom with a +1 formal charge? (All nonbonded electron pairs have been drawn in.)



Answer

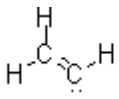
✓ a
b
c
d

e

Add Question Here

Question 39 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following species contains a carbon atom with a –1 formal charge? (All nonbonded electron pairs have been drawn in.)

a. H–C≡C–H **b.**  **c.** H–C–H **d.**  **e.** $H_2C=C=CH_2$

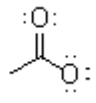
Answer

a
✓ b
c
d
e

Add Question Here

Question 40 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following species contains an O atom with a +1 formal charge? (All nonbonded electron pairs have been drawn in.)

a.  **b.**  **c.**  **d.**  **e.** 

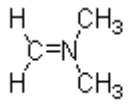
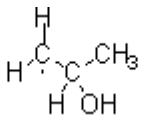
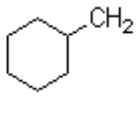
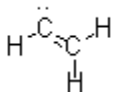
Answer

a
✓ b
c
d
e

Add Question Here

Question 41 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following species contains a carbon atom with a +1 formal charge? (All nonbonded electrons and electron pairs have been drawn in.)

a. H–C≡C: **b.**  **c.**  **d.**  **e.** 

Answer

a
b
c
✓ d
e

Add Question Here

Question 42 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following species has (have) a trigonal planar structure with 120° bond angles around the labeled carbon atom?

a. $H_2C=C=CH_2$ **b.** **c.** **d.** b and c **e.** a, b and c

Answer

a
b
c
✓ d
e

Add Question Here

Question 43 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following molecules has (have) a trigonal planar geometry?

a. **b.** **c.** **d.** a and c **e.** None of the choices are correct.

Answer

✓ a
b
c
d
e

Add Question Here

Question 44 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following compounds possess(es) a nitrogen with tetrahedral geometry?

Answer $CH_3C{\equiv}N$:

NH_2^-

NH_4^+

$CH_3C{\equiv}N$: and NH_2^- are both tetrahedral.

✓ NH_2^- and NH_4^+ are both tetrahedral.

Add Question Here

Question 45 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following molecules is (are) polar?

a. CH_3Cl **b.** CH_2Cl_2 **c.** CCl_4

Answer

a

b

c

✓ a and b

b and c

Add Question Here

Question 46 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following statements is (are) correct?

Answer

Ethane has sp^3 carbon atoms and the geometry around each carbon is trigonal planar.

✓ Ethane has sp^3 carbon atoms and the geometry around each carbon is tetrahedral.

Ethane has sp^2 carbon atoms and the geometry around each carbon is tetrahedral.

Ethane has sp^2 carbon atoms and the geometry around each carbon is trigonal planar.

None of the statements are correct.

Add Question Here

Question 47 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following statements is (are) correct?

Answer

The carbon–carbon distance in acetylene is longer than in ethylene.

The carbon–hydrogen bond in acetylene is weaker than the carbon–hydrogen bond in ethane.

✓ The carbon–carbon distance in acetylene is shorter than in ethane.

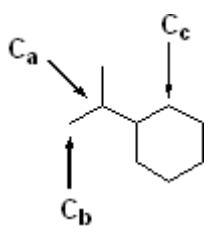
The statements (The carbon–carbon distance in acetylene is longer than in ethylene) and (The carbon hydrogen bond in acetylene is weaker than the carbon hydrogen bond in ethane) are correct.

The statements (The carbon hydrogen bond in acetylene is weaker than the carbon hydrogen bond in ethane) and (The carbon–carbon distance in acetylene is shorter than in ethane) are correct.

Add Question Here

Question 48 **Multiple Choice** **0 points** Modify Remove

Question
How many hydrogens are directly bonded to each of the indicated carbon atoms?



Answer

✓ C_a 1; C_b 3; C_c 2

C_a 2; C_b 3; C_c 2

C_a 1; C_b 2; C_c 2

C_a 1; C_b 3; C_c 3

None of the choices is correct.

Add Question Here

Question 49 **Multiple Choice** **0 points** Modify Remove

Question
Of the molecules listed, which does *not* have a dipole moment?

Answer

HCl

NCl_3

CO

✓ BF_3

All molecules have a dipole moment.

Add Question Here

Question 50 **Multiple Choice** **0 points** Modify Remove

Question
For the elements Rb, F, and O, the order of increasing electronegativity is:

Answer

Rb < F < O

✓ Rb < O < F

O < F < Rb

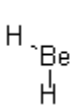
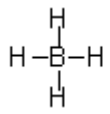
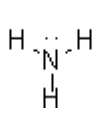
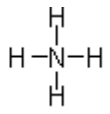
F < Rb < O

The order cannot be determined.

Add Question Here

Question 51 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following Lewis dot structure(s) below bear(s) a positive charge?

a.  **b.**  **c.**  **d.**  **e.** 

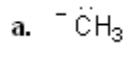
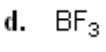
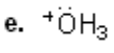
Answer

a
b
c
c and d
✓ d and e

Add Question Here

Question 52 **Multiple Choice** **0 points** Modify Remove

Question
Which of the following species has (have) a trigonal planar structure?

a.  **b.**  **c.**  **d.**  **e.** 

Answer

a, b, and c
✓ b and d
d
b, d, and e
All of the choices are correct.

Add Question Here

Question 53 **Multiple Choice** **0 points** Modify Remove

Question
What is the molecular shape of methyl anion?

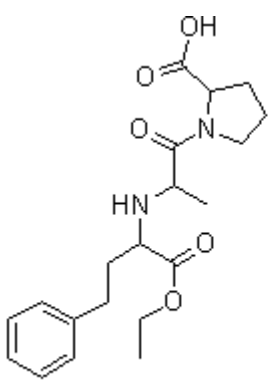
Answer

Octahedral
Tetrahedral
Trigonal planar
✓ Trigonal pyramidal
Linear

Add Question Here

Question 54 **Multiple Choice** **0 points** Modify Remove

Question
Enalapril is currently in clinical trials for congestive heart failure, and its structure is given below. What is the correct molecular formula for this interesting antihypertensive agent?



Enalapril

a. $C_{20}H_{28}N_2O_5$ **d.** $C_{20}H_{26}N_2O_5$

b. $C_{18}H_{26}N_2O_5$ **e.** $C_{18}H_{25}N_2O_5$

c. $C_{16}H_{24}N_2O_5$

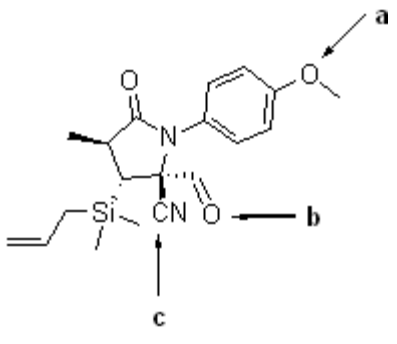
Answer

✓ a
b
c
d
e

Add Question Here

Question 55 **Multiple Choice** **0 points** Modify Remove

Question
The following compound is a synthetic intermediate in the production of **lactacystin**. Identify the orbital hybridization and geometry of the atoms next to the three arrows.



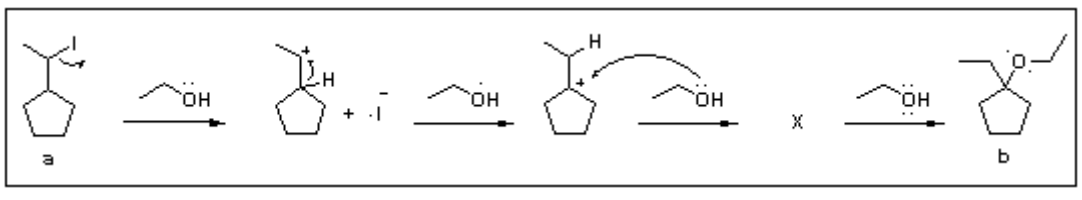
Answer

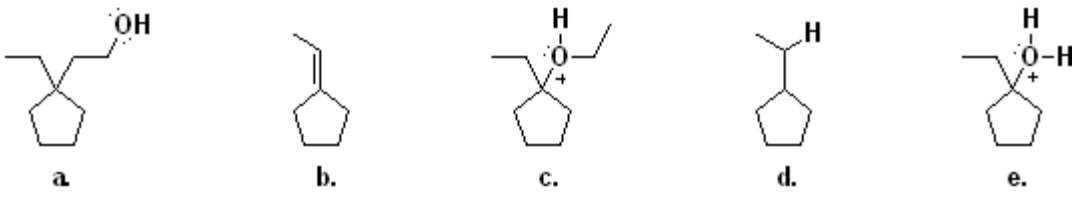
a – sp^3; **b** – sp^2; **c** – sp^3
a – sp^2; **b** – sp; **c** – sp^3
a – sp^2; **b** – sp^3; **c** – sp^2
✓ **a** – sp^3; **b** – sp^2; **c** – sp
None of the choices is correct.

Add Question Here

Question 56 **Multiple Choice** **0 points** Modify Remove

Question
The following scheme represents an S_N1 mechanism for the conversion of alkyl halide "**a**" to ether "**b**." Determine the correct structure for intermediate "**X**" based on the curved arrow formulism shown.





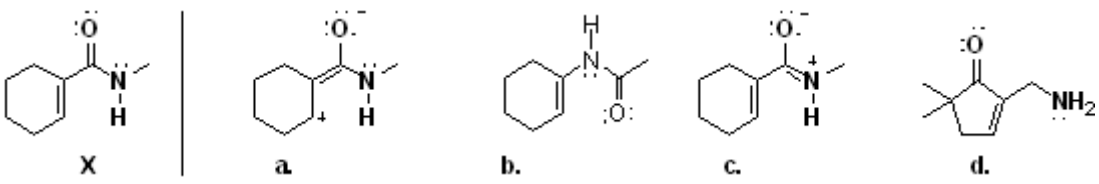
Answer

a
b
✓ c
d
e

Add Question Here

Question 57 **Multiple Choice** **0 points** Modify Remove

Question
With reference to compound **X** drawn below, label each compound as an isomer, a resonance structure or neither.



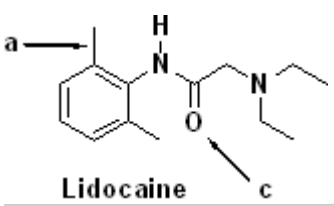
Answer

a. resonance structure; **b.** isomer; **c.** neither; **d.** isomer
a. isomer; **b.** resonance structure; **c.** isomer; **d.** neither
a. isomer; **b.** neither; **c.** isomer; **d.** resonance structure
✓ **a.** resonance structure; **b.** isomer; **c.** resonance structure; **d.** isomer
None of the choices are correct.

Add Question Here

Question 58 **Multiple Choice** **0 points** Modify Remove

Question
Answer the following questions about **lidocaine**, a commonly used dental anesthetic.



Reference: Ref 1-1

What orbitals are used to form the bond indicated by **a**?

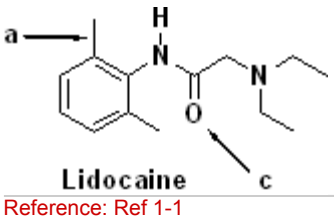
Answer

Csp^2–Csp^2
✓ Csp^3–Csp^2
Csp^2–Csp
Csp–Csp^2
Csp^3–Csp

Add Question Here

Question 59 **Multiple Choice** **0 points** Modify Remove

Question
Answer the following questions about **lidocaine**, a commonly used dental anesthetic.



Reference: Ref 1-1

How many carbon atoms have sp^2 hybridization?

Answer

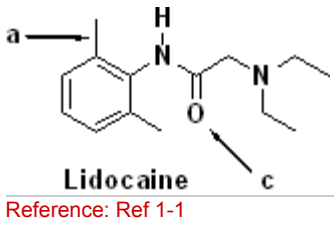
- ✓ 7
- 5
- 6
- 10
- 8

Add Question Here

Question 60 **Multiple Choice** **0 points** Modify Remove

Question

Answer the following questions about **lidocaine**, a commonly used dental anesthetic.



Reference: Ref 1-1

Predict the geometry around the oxygen atom indicated by arrow **c**.

Answer

- Linear
- Tetrahedral
- Trigonal bipyrimidal
- ✓ Trigonal planar
- Square planar

Add Question Here

OK