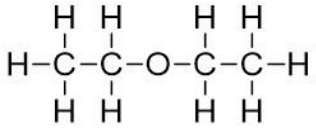
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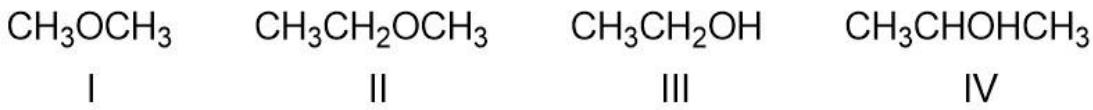
Organic Chemistry, 4e **(Klein)**
Chapter 2 Molecular Representations

1) What is the molecular formula for the following compound?



A) C_2H_6O
B) C_4H_6O
C) $C_4H_{10}O$
D) C_2H_4O
E) None of these
Answer: C
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

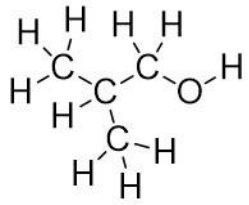
2) Which of the following compounds have a molecular formula of C_2H_6O?



A) I
B) II
C) III
D) IV
E) Both I and III
Answer: E
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

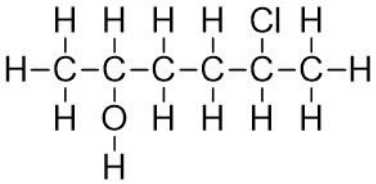
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3) Which of the following is the correct condensed structure for the following compound?



A) $CH_3CHCH_3CH_2OH$
B) $CH_3CH_2CH_2OH$
C) $(CH_3)_2CHCH_2OH$
D) $CH_3CH_2CH_2OCH_3$
E) $CH_3CH_3CHCH_2OH$
Answer: C
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

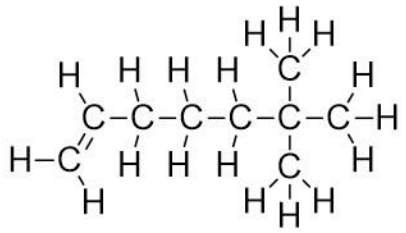
4) Which of the following is the correct condensed structure for the following compound?



A) $CH_3CHOHCH_2CHClCH_3$
B) $CH_3CH(OH)CH_2CH_2CHClCH_3$
C) $(CH_3)_2CHOHCH_2CH_2Cl$
D) $HOCH_3CHCH_2CH_2CH_3CHCl$
E) $CH_3C_2H_4CH_3OHCl$
Answer: B
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

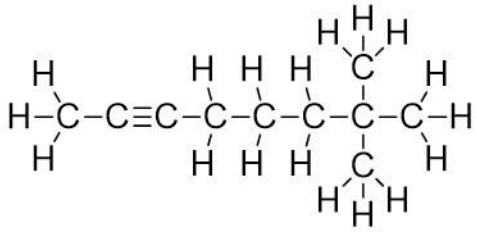
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5) Which of the following is the correct condensed structure for the following compound?



A) CH_2=CH$(CH_2)_3C(CH_3)_3$
B) CH_2=$(CH_2)_4C(CH_3)_3$
C) $(CH_3)_2CH(CH_2)_4CH_3$
D) CH_2=C$(CH_2)_3(CCH_3)_3$
E) $(CH)_3(CH_2)_3C(CH_3)_3$
Answer: A
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

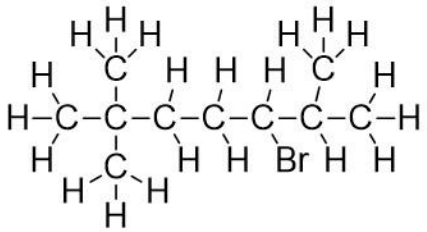
6) Which of the following is the correct condensed structure for the following compound?



A) HC≡C$(CH_2)_3C(CH_3)_3$
B) HC≡C$(CH_2)_3C(CH_3CH_3CH_3)$
C) $(CH_3)_3C_2(CH_2)_3CH_3$
D) CH_3C≡C$(CH_2)_3C(CH_3)_3$
E) CH_3C≡C$((CH_2)C(CH_3))_3$
Answer: D
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

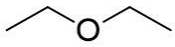
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7) Which of the following is the correct condensed structure for the following compound?



A) $CH_3C(CH_3)_2(CH_2)_2(CH)BrC(CH_3)_2$
B) $CH_3CH_3CH_3C(CH_2)_2C(CH_3)_2CHBr$
C) $(CH_3)_3C(CH_2)_3BrCHCH_3CH_3$
D) $CH_3CH_3CH_3C(CH_2)_2CHBrCHCH_3CH_3$
E) $(CH_3)_3C(CH_2)_2CHBrCH(CH_3)_2$
Answer: E
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

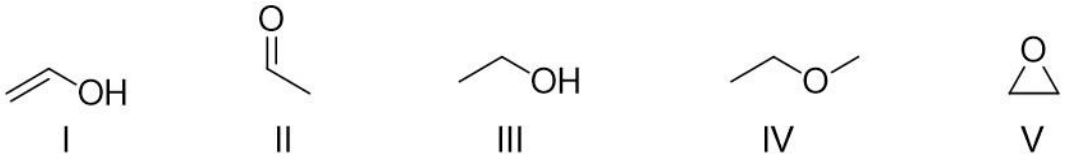
8) What is the molecular formula for the following compound?



A) C_2H_6O
B) C_4H_6O
C) $C_4H_{10}O$
D) C_2H_4O
E) C_2H_5O
Answer: C
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

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9) Which of the following compounds have a molecular formula of C_2H_6O?



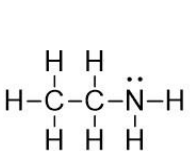
I II III IV V

A) I
B) II
C) III
D) IV
E) V
Answer: C
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

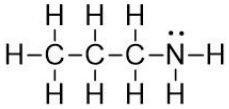
10) Which of the following is the correct molecular formula for $(CH_3CH_2)_4C$?
A) C_8H_{20}
B) C_5H_{20}
C) C_9H_{20}
D) C_6H_5
E) C_3H_{20}
Answer: C
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

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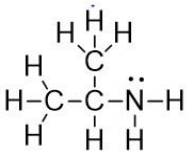
11) Which of the following is the correct Lewis structure for $CH_3(CH_2)_2NH_2$?



I



II



III

$CH_3CH_2CH_2NH_2$

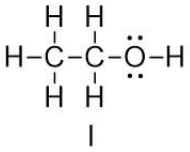
IV



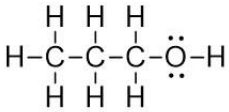
V

A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

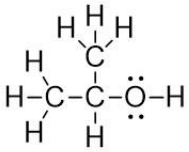
12) Which of the following is the correct Lewis structure for $CH_3(CH_2)_2OH$?



I



II



III

$CH_3CH_2CH_2OH$

IV

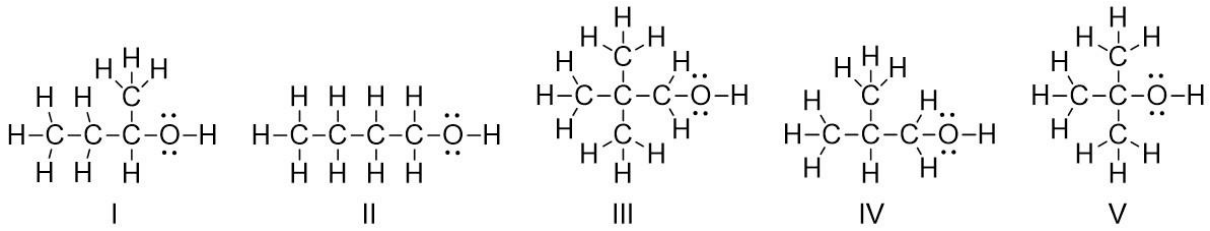


V

A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

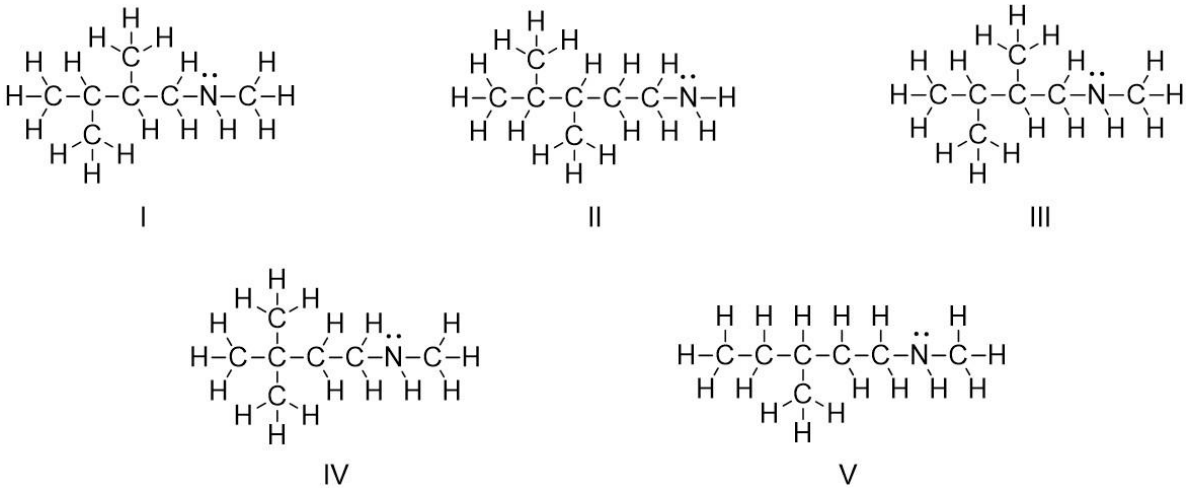
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13) Which of the following is the correct Lewis structure for $(CH_3)_2CHCH_2OH$?



A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

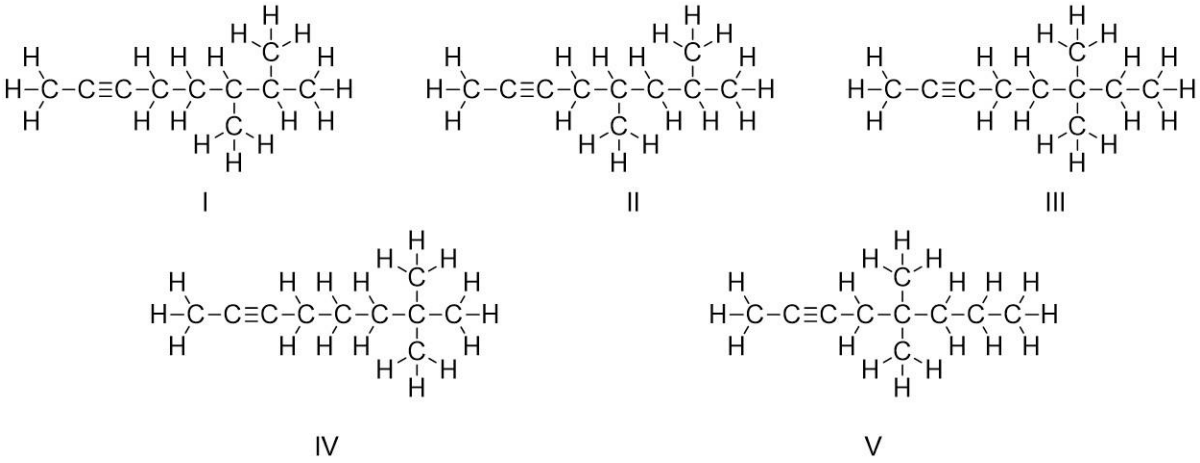
14) Which of the following is the correct Lewis structure for $(CH_3)_3C(CH_2)_2NHCH_3$?



A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

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15) Which of the following is the correct Lewis structure for $CH_3C{\equiv}C(CH_2)_3C(CH_3)_3$?

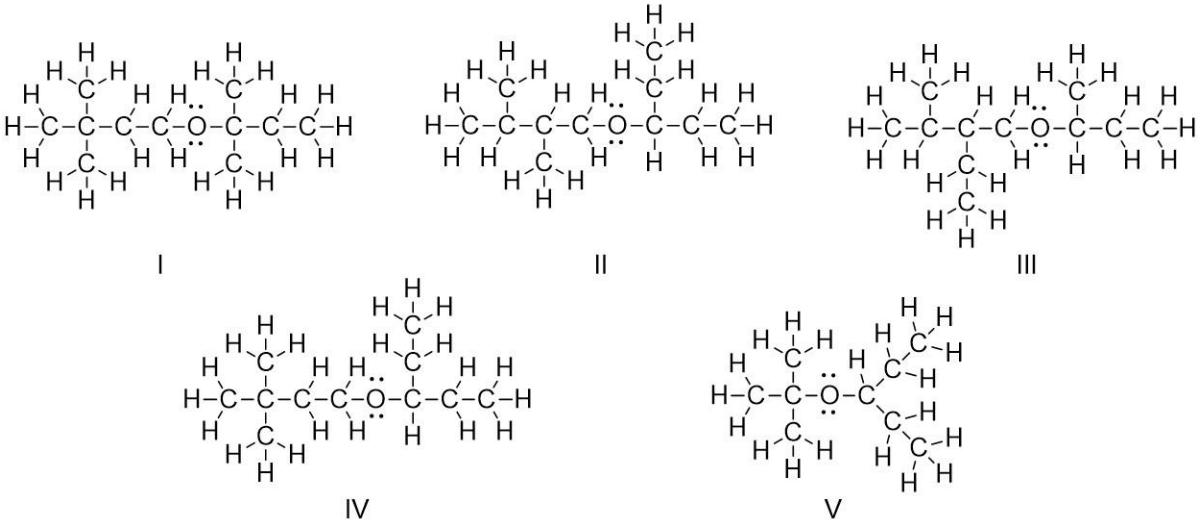


I II III IV V

A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

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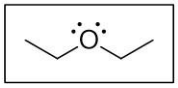
16) Which of the following is the correct Lewis structure for $(CH_3)_3C(CH_2)_2OCH(CH_2CH_3)_2$?

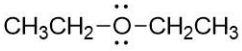


A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

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17) Identify the partially condensed structure for the molecule shown in the box below.





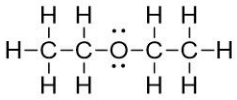
I



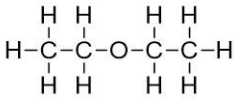
II



III



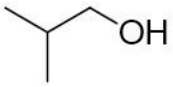
IV



V

A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

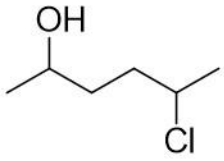
18) Which of the following is the correct condensed structure for the following compound?



A) $CH_3CHCH_3CH_2OH$
B) $CH_3CH_2CH_2OH$
C) $(CH_3)_2CHCH_2OH$
D) $CH_3CH_2CH_2OCH_3$
E) $CH_3CH_3CHCH_2OH$
Answer: C
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

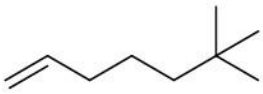
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19) Which of the following is the correct condensed structure for the following compound?



A) $CH_3CHOHCH_2CHClCH_3$
B) $CH_3CHOH(CH_2)_2CHClCH_3$
C) $(CH_3)_2CHOHCH_2CH_2Cl$
D) $HOCH_3CHCH_2CH_2CH_3CHCl$
E) $CH_3C_2H_4CH_3OHCl$
Answer: B
Diff: 1
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

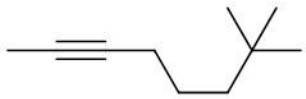
20) Which of the following is the correct condensed structure for the following compound?



A) $CH_2=CH(CH_2)_3C(CH_3)_3$
B) $CH=(CH_2)_4C(CH_3)_3$
C) $(CH_3)_2CH(CH_2)_4CH_3$
D) $CH_2=C(CH_2)_3(CCH_3)_3$
E) $(CH)_3(CH_2)_3C(CH_3)_3$
Answer: A
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

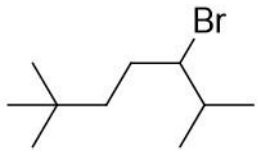
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21) Which of the following is the correct condensed structure for the following compound?



A) $HC{\equiv}C(CH_2)_3C(CH_3)_3$
B) $HCC(CH_2)_3C(CH_3CH_3CH_3)$
C) $(CH_3)_3C_2(CH_2)_3CH_3$
D) $CH_3C{\equiv}C(CH_2)_3C(CH_3)_3$
E) $CH_3CC(CH_2)C(CH_3)_3$
Answer: D
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

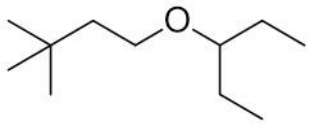
22) Which of the following is the correct condensed structure for the following compound?



A) $CH_3C(CH_3)_2(CH_2)_2(CH)BrC(CH_3)_2$
B) $CH_3CH_3CH_3C(CH_2)_2C(CH_3)_2CHBr$
C) $(CH_3)_3C(CH_2)_3BrCHCH_3CH_3$
D) $CH_3CH_3CH_3C(CH_2)_2CHBrCHCH_3CH_3$
E) $(CH_3)_3C(CH_2)_2CHBrCH(CH_3)_2$
Answer: E
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

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23) Which of the following is the correct condensed structure for the following compound?



A) $CH_3CH_3CH_3CCH_2CH_2OCHCH_2CH_3CH_2CH_3$
B) $(CH_3)_3(CH_2)_2OC(CH_2CH_3)_2$
C) $(CH_3)_3CCH_2OCHCH_2CH_3$
D) $(CH_3)_3C(CH_2)_2OCH(CH_2CH_3)_2$
E) $(CH_3)_3(CCH_2)_2O(CHCH_2CH_3)_2$
Answer: D
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

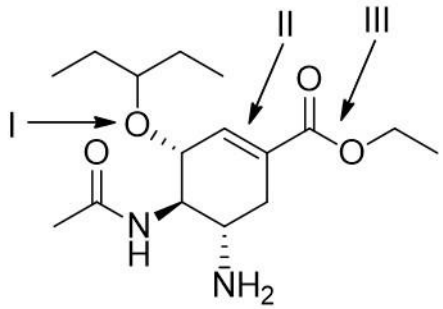
24) Which of the following is the correct condensed structure for the following compound?



A) $(CH_3)_2N(CH_2)_3CH(CH_3)_2$
B) $CH_3CH_2NCH_2CH(CH_3)_2$
C) $N(CH_3)_2CH(CH_2)_3(CH_3)_2$
D) $CH_3CH_3NCH_23CHCH_3CH_3$
E) $(CH_3)_2(NCH_2)_3(CHCH_3)_2$
Answer: A
Diff: 2
Learning Objective: 2.1 Convert molecular representations from one drawing style to another, including Lewis structures, partially condensed structures, condensed structures, and molecular formulas

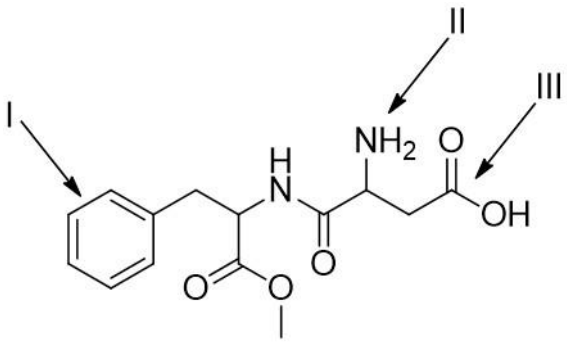
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25) Tamiflu®, the most effective antiviral drug used to treat avian influenza, has the following structure. Identify the functional groups in Tamiflu®.



A) I = ester; II = aromatic; III = carboxylic acid
B) I = ether; II = aromatic; III = anhydride
C) I = ether; II = alkene; III = ether
D) I = alcohol; II = alkyne; III = carboxylic acid
E) I = ether; II = alkene; III = ester
Answer: E
Diff: 2
Learning Objective: 2.3 Identify and draw the functional groups

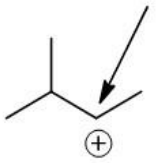
26) Aspartame, an artificial sweetener used in Equal® and diet beverages, has the following structure. Identify the functional groups in Aspartame.



A) I = aromatic; II = amine; III = carboxylic acid
B) I = alkene; II = amide; III = alcohol
C) I = aromatic; II = amine; III = ester
D) I = alkene; II = amine; III = anhydride
E) I = aromatic; II = amide; III = carboxylic acid
Answer: A
Diff: 2
Learning Objective: 2.3 Identify and draw the functional groups

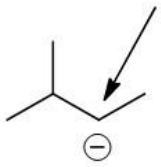
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27) How many hydrogen atoms are connected to the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

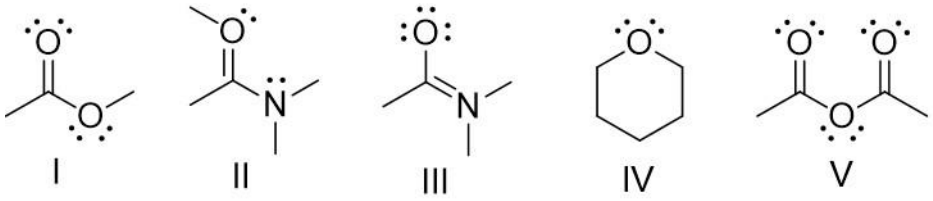
28) How many hydrogen atoms are connected to the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

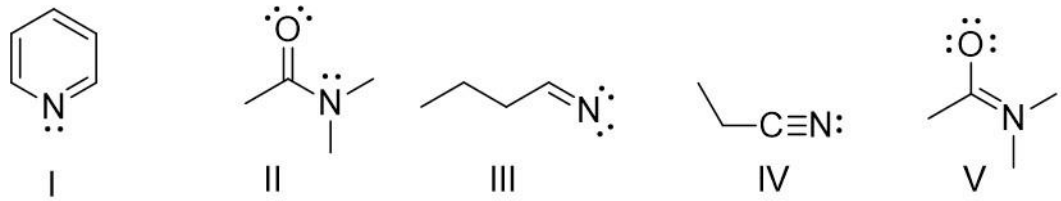
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29) Which of the following structures have -1 as a formal charge on an oxygen atom?



A) I
B) II
C) III
D) IV
E) V
Answer: C
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

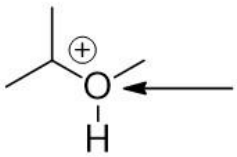
30) Which of the following structures have -1 as a formal charge on the nitrogen atom?



A) I
B) II
C) III
D) IV
E) V
Answer: C
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

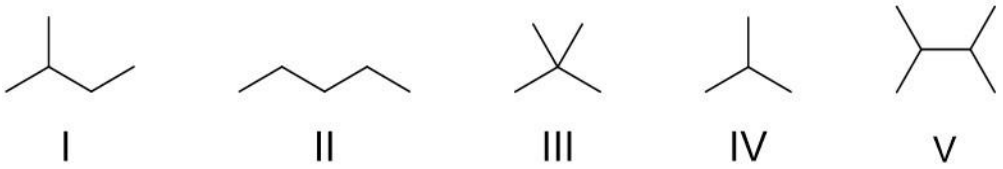
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31) How many lone pairs of electrons are found on the indicated atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

32) Which of the following is the correct bond-line structure for $(CH_3)_4C$?



A) I
B) II
C) III
D) IV
E) V
Answer: C
Diff: 1
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

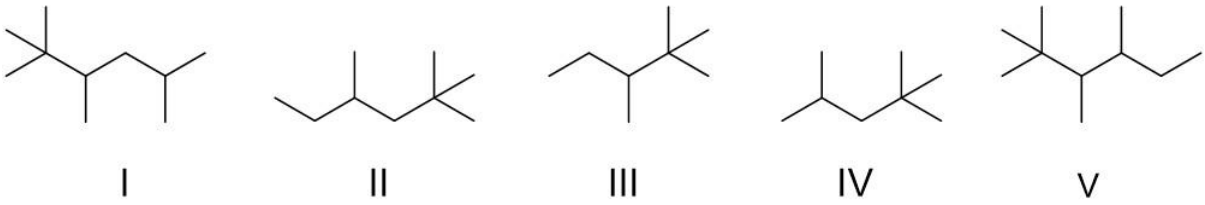
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33) Which of the following is the correct bond-line structure for $(CH_3)_2CHCH_2CH_3$?



A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 1
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

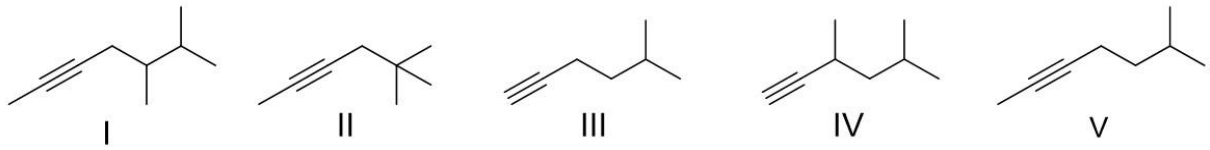
34) Which of the following is the correct bond-line structure for $(CH_3)_2CHCH_2C(CH_3)_3$?



A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

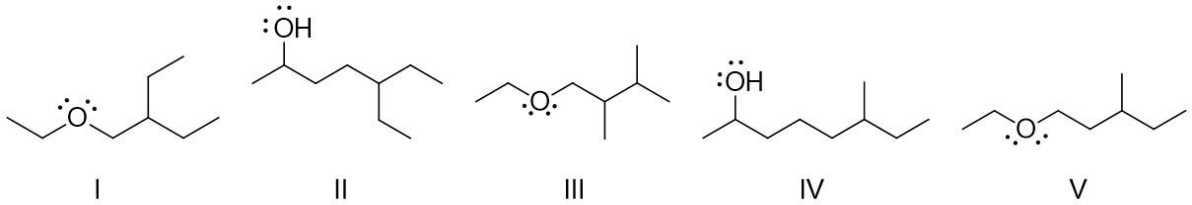
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35) Which of the following is the correct bond-line structure for $CH_3C{\equiv}C(CH_2)_2CH(CH_3)_2$?



A) I
B) II
C) III
D) IV
E) V
Answer: E
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

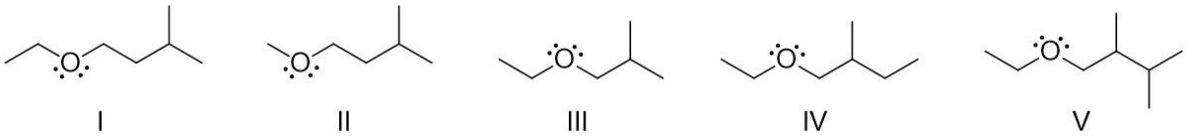
36) Which of the following is the correct bond-line structure for $CH_3CHOH(CH_2)_2CH(CH_2CH_3)_2$?



A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

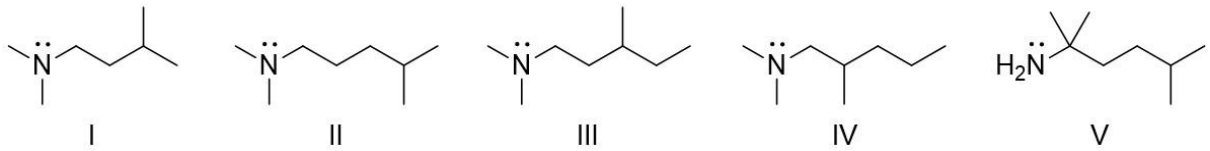
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37) Which of the following is the correct bond-line structure for $CH_3CH_2O(CH_2)_2CH(CH_3)_2$?



A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

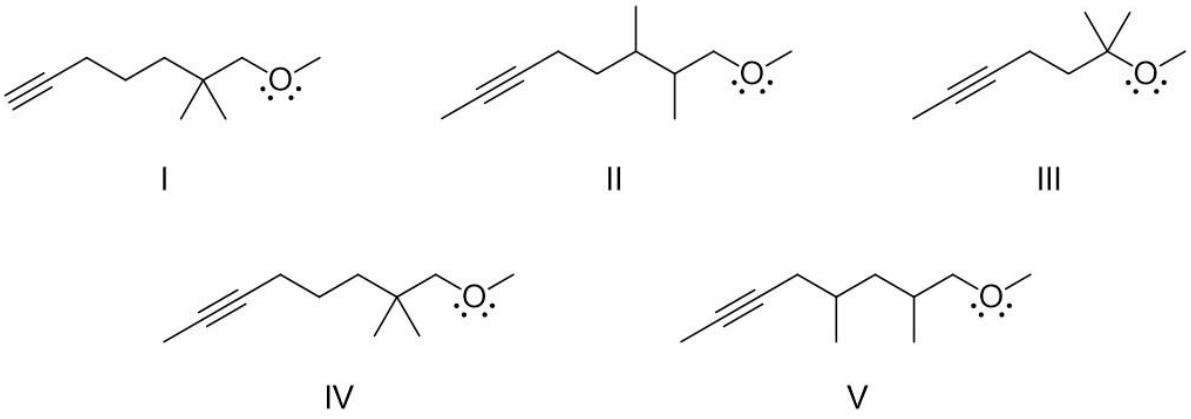
38) Which of the following is the correct bond-line structure for $(CH_3)_2N(CH_2)_3CH(CH_3)_2$?



A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

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39) Which of the following is the correct bond-line structure for $CH_3C{\equiv}C(CH_2)_3C(CH_3)_2CH_2OCH_3$?



A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

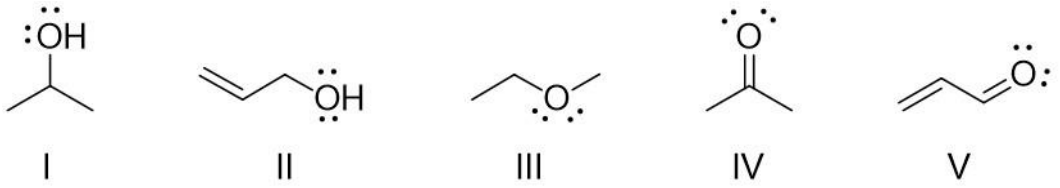
40) Identify bond-line structures for constitutional isomers with a molecular formula of C_2H_4O.



A) I and V
B) II and IV
C) I, III, and V
D) II, III, and IV
E) IV and V
Answer: C
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

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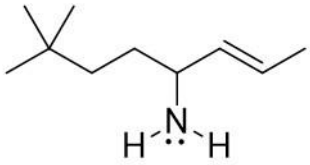
41) Identify bond-line structures for constitutional isomers with a molecular formula of C_3H_8O.



I II III IV V

A) I and II
B) I and III
C) II, IV, and V
D) II and IV
E) I and IV
Answer: B
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

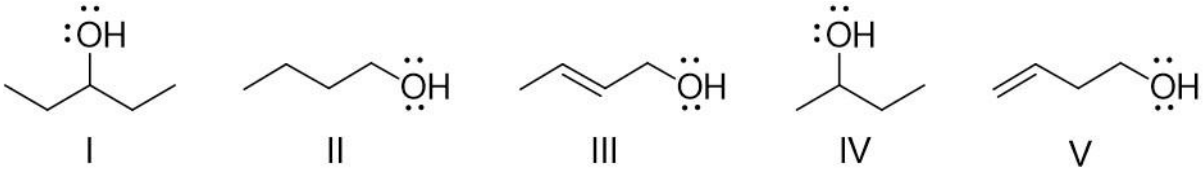
42) Which of the following is the correct condensed structure for the following compound?



A) $CH_3CH_3CH_3C(CH_2)_2CH(NH_2)CH{=}CHCH_3$
B) $(CH_3)_3C(CH_2)_2CH(NH_2)CH{=}CHCH_3$
C) $(CH_3)_3CCH_2CH(NH_2)CH{=}CHCH_3$
D) $(CH_3)_3CCH_2CHN(H)_2(CH)_2CH_3$
E) $(CH_3C)_3(CH_2)_2CHNH_2(CH)_2CH_3$
Answer: B
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

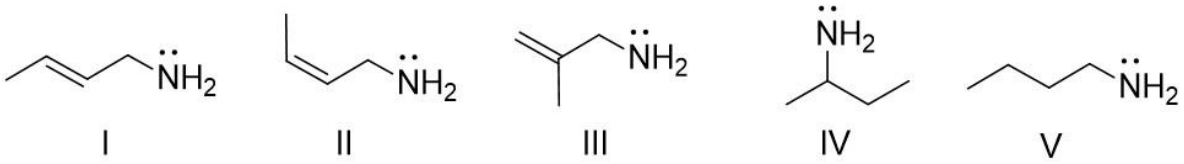
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43) Identify bond-line structures for constitutional isomers with a molecular formula of $C_4H_{10}O$.



A) I and II
B) II and III
C) III and IV
D) IV and V
E) II and IV
Answer: E
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

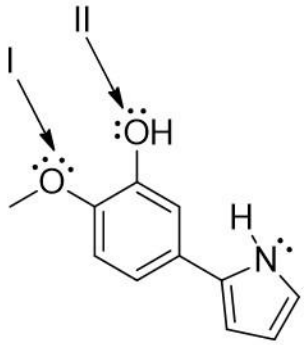
44) Identify bond-line structures for constitutional isomers with a molecular formula of $C_4H_{11}N$.



A) I and II
B) II and III
C) III and IV
D) IV and V
E) II and IV
Answer: D
Diff: 2
Learning Objective: 2.2 Demonstrate how to read and draw bond-line structures through converting other styles of molecular representation into bond-line structures and vice versa

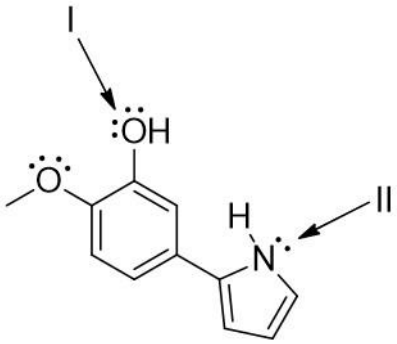
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45) For the following compound identify the indicated lone pairs as localized or delocalized.



A) I = both localized; II = both localized
B) I = both localized; II = one localized and one delocalized
C) I = one localized and one delocalized; II = both localized
D) I = one localized and one delocalized; II = one localized and one delocalized
E) I = both delocalized; II = both delocalized
Answer: D
Diff: 2
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

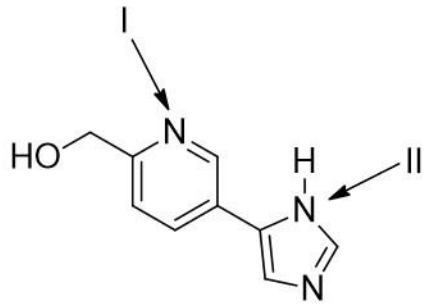
46) For the following compound identify the indicated lone pairs as localized or delocalized.



A) I = both delocalized; II = localized
B) I = both localized; II = localized
C) I = both delocalized; II = delocalized
D) I = one localized and one delocalized; II = localized
E) I = one localized and one delocalized; II = delocalized
Answer: E
Diff: 2
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

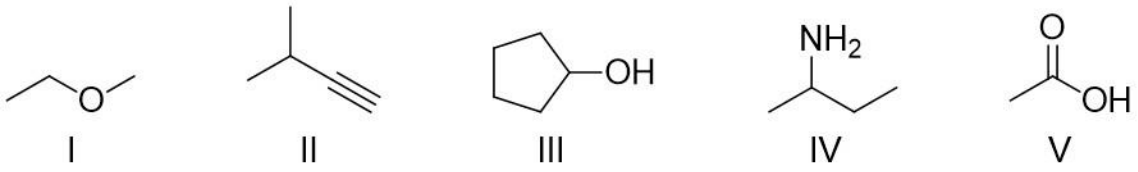
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47) For the following compound, what is the hybridization and molecular geometry at the indicated atoms.



A) I = sp^2, bent; II = sp^2, trigonal pyramidal
B) I = sp^2, bent; II = sp^2, trigonal planar
C) I = sp^2, linear; II = sp^2, trigonal pyramidal
D) I = sp, linear; II = sp^2, trigonal planar
E) I = sp^2, trigonal planar; II = sp^2, trigonal planar
Answer: B
Diff: 3
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

48) Which of the following compounds contain an alcohol functional group?

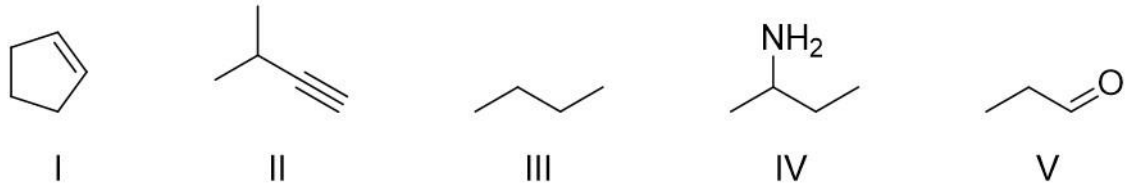


I II III IV V

A) I
B) II
C) III
D) IV
E) V
Answer: C
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

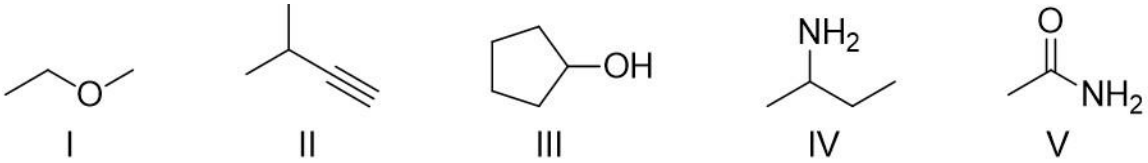
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49) Which of the following compounds contain an alkene functional group?



A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

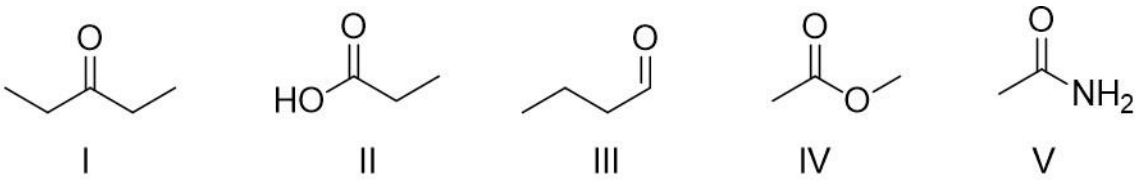
50) Which of the following compounds contain an amine functional group?



A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

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51) Which of the following compounds contain a ketone functional group?



A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

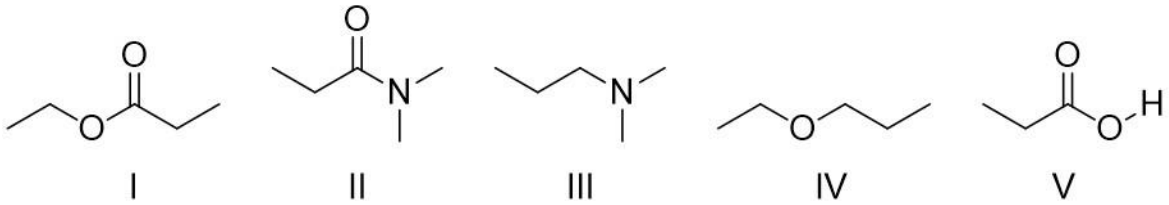
52) Which of the following compounds contain an aromatic ring?



A) I
B) II
C) III
D) IV
E) V
Answer: C
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

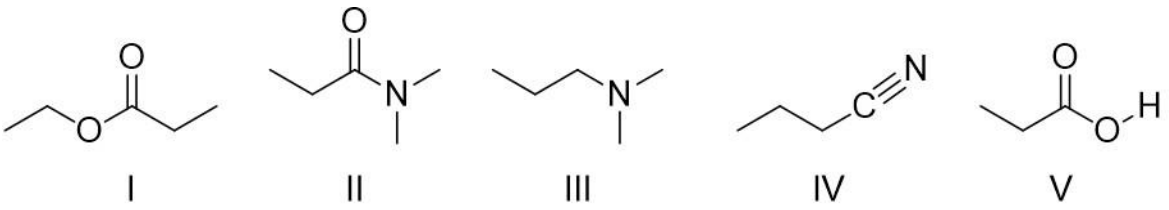
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53) Which of the following compounds contain an ester functional group?



A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

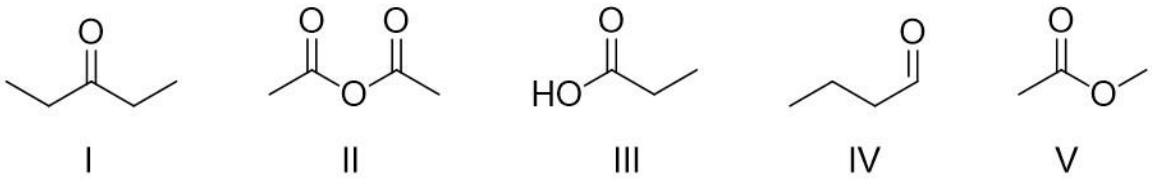
54) Which of the following compounds contain an amide functional group?



A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

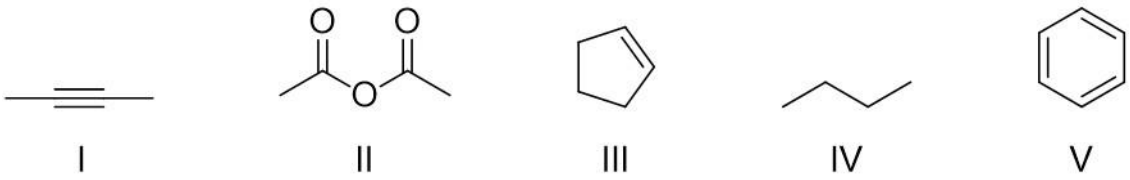
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55) Which of the following compounds contain an anhydride functional group?



A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

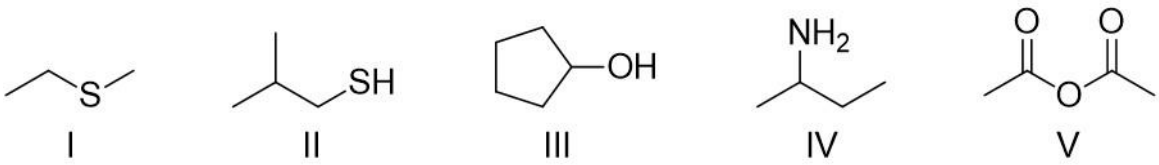
56) Which of the following compounds contain an alkyne functional group?



A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

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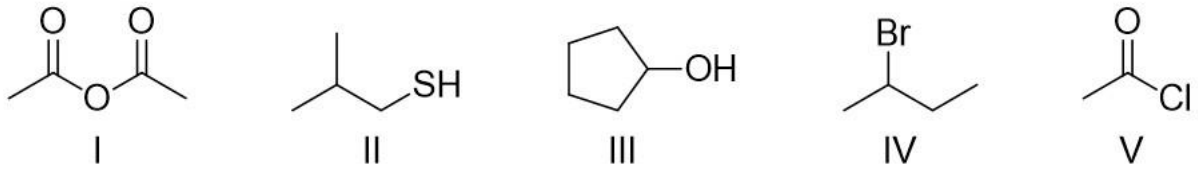
57) Which of the following compounds contain a thiol functional group?



I II III IV V

A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

58) Which of the following compounds contain an alkyl halide functional group?

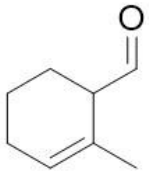


I II III IV V

A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 1
Learning Objective: 2.3 Identify and draw the functional groups

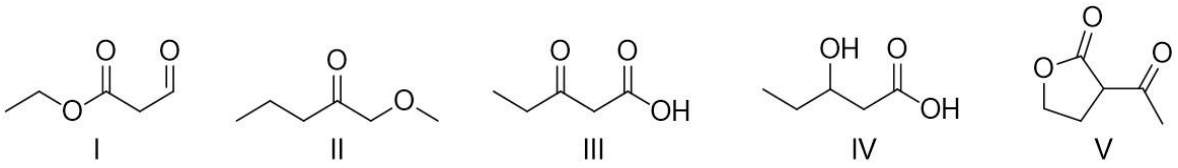
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59) What functional groups are present in the following compound?



A) ketone and alkene
B) ketone and alkyne
C) aldehyde and alkene
D) aldehyde and alkyne
E) ester and alkene
Answer: C
Diff: 2
Learning Objective: 2.3 Identify and draw the functional groups

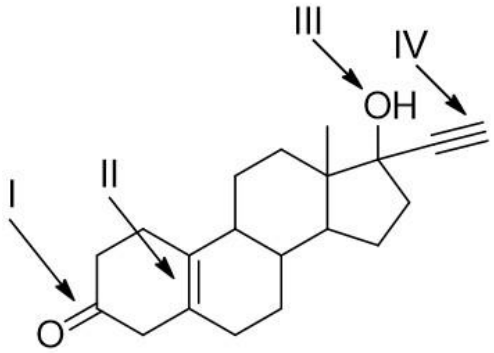
60) Which of the following compounds have both ketone and ester functional groups?



A) I
B) II
C) III
D) IV
E) V
Answer: E
Diff: 2
Learning Objective: 2.3 Identify and draw the functional groups

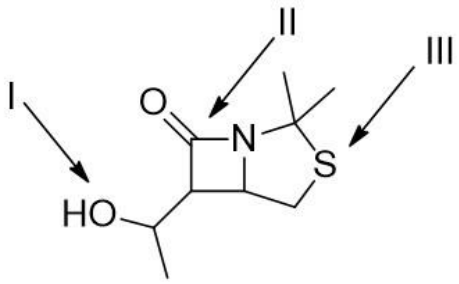
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61) Norethynodrel, a component of the first combined oral contraceptive, has the following structure. Identify the indicated functional groups in Norethynodrel.



A) I = aldehyde; II = alkyne; III = alcohol; IV = alkene
B) I = ketone; II = alkene; III = alcohol; IV = alkyne
C) I = ketone; II = aromatic; III = alcohol; IV = alkyne
D) I = anhydride; II = alkene;III = carboxylic acid; IV = alkene
E) I = ester; II = alkene; III = alcohol; IV = alkyne
Answer: B
Diff: 2
Learning Objective: 2.3 Identify and draw the functional groups

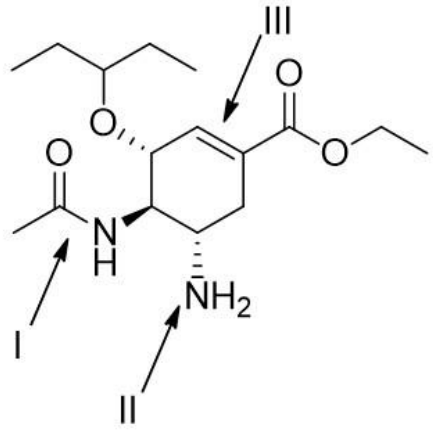
62) Identify the indicated functional groups in the following compound.



A) I = alcohol; II = amine; III = thiol
B) I = ester; II = ketone; III = thiol
C) I = alcohol; II = amide; III = sulfide
D) I = ether; II = amide; III = thiol
E) I = alcohol; II = aldehyde; III = sulfide
Answer: C
Diff: 2
Learning Objective: 2.3 Identify and draw the functional groups

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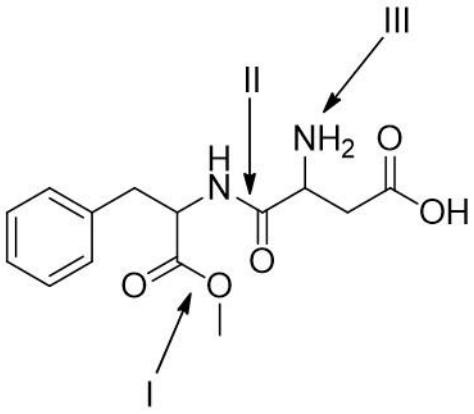
63) Tamiflu®, the most effective antiviral drug used to treat avian influenza, has the following structure. Identify the indicated functional groups in Tamiflu®.



A) I = ketone; II = amine; III = alkene
B) I = ester; II = amide; III = alkyne
C) I = amine; II = amide; III = alkene
D) I = amide; II = amine; III = alkene
E) I = amine; II = amine; III = aromatic
Answer: D
Diff: 2
Learning Objective: 2.3 Identify and draw the functional groups

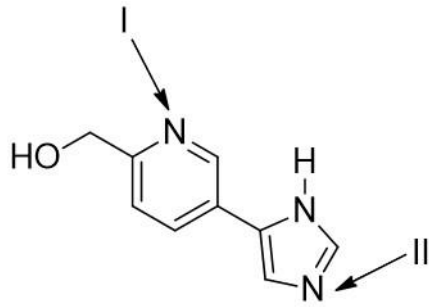
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64) Aspartame, an artificial sweetener used in Equal® and diet beverages, has the following structure. Identify the indicated functional groups in Aspartame.



A) I = ester; II = amide; III = amine
B) I = ester; II = amine; III = amide
C) I = ether; II = amide; III = amine
D) I = ether; II = amine; III = amide
E) I = anhydride; II = ketone; III = amine
Answer: A
Diff: 2
Learning Objective: 2.3 Identify and draw the functional groups

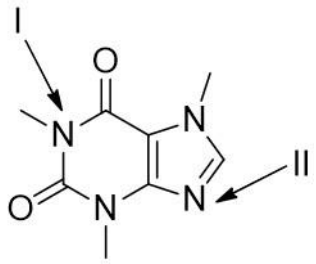
65) For the following compound, identify the hybridization and molecular geometry at the indicated atoms.



A) I = sp^2, bent; II = sp^2, trigonal pyramidal
B) I = sp^2, linear; II = sp^2, bent
C) I = sp^2, bent; II = sp^2, bent
D) I = *sp*, trigonal planar; II = *sp*, trigonal planar
E) I = *sp*, linear; II = *sp*, linear
Answer: C
Diff: 3
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

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66) Caffeine has the following structure. Identify the hybridization and molecular geometry at the indicated atoms.



A) I = sp^3, trigonal pyramidal; II = sp^2, trigonal planar
B) I = sp^3, trigonal planar; II = sp^2, bent
C) I = sp^2, trigonal pyramidal; II = sp, linear
D) I = sp^2, trigonal planar; II = sp^2, bent
E) I = sp^3, trigonal pyramidal; II = sp^2, bent
Answer: D
Diff: 3
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

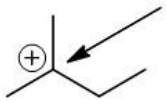
67) How many hydrogen atoms are connected to the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: B
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

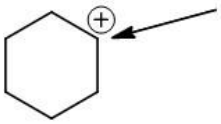
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68) How many hydrogen atoms are connected to the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: E
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

69) How many hydrogen atoms are connected to the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

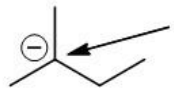
70) How many hydrogen atoms are connected to the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: B
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

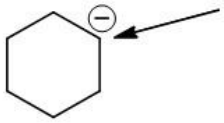
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71) How many hydrogen atoms are connected to the indicated carbon atom?



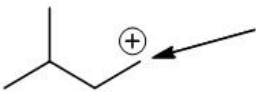
A) one
B) two
C) three
D) four
E) none
Answer: E
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

72) How many hydrogen atoms are connected to the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

73) How many lone pairs of electrons are found on the indicated atom?



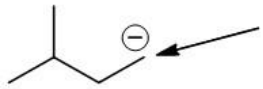
A) one
B) two
C) three
D) four
E) none
Answer: E
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

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74) What is the formal charge on a carbon atom with singles bonds to three other carbon atoms and no lone pairs?
A) -2
B) -1
C) 0
D) +1
E) +2
Answer: D
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

75) What is the formal charge on a carbon atom with single bonds to three other carbon atoms and one lone pair?
A) -2
B) -1
C) 0
D) +1
E) +2
Answer: B
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

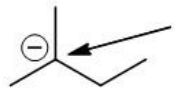
76) How many lone pairs of electrons are found on the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

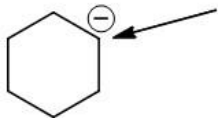
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77) How many lone pairs of electrons are found on the indicated carbon atom?



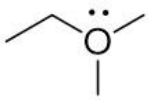
A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

78) How many lone pairs of electrons are found on the indicated carbon atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.4 Identify formal charges on carbon

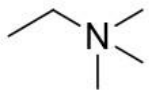
79) What is the formal charge on the oxygen atom in the following compound?



A) +1
B) +2
C) -1
D) -2
E) 0
Answer: A
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

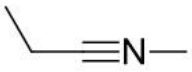
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80) What is the formal charge on the nitrogen atom in the following compound?



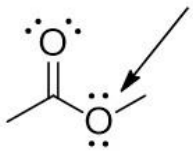
A) -1
B) -2
C) +1
D) +2
E) 0
Answer: C
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

81) What is the formal charge on the nitrogen atom in the following compound?



A) +1
B) +2
C) -1
D) -2
E) 0
Answer: A
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

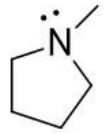
82) What is the formal charge on the indicated oxygen atom in the following compound?



A) +1
B) +2
C) -1
D) -2
E) 0
Answer: E
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

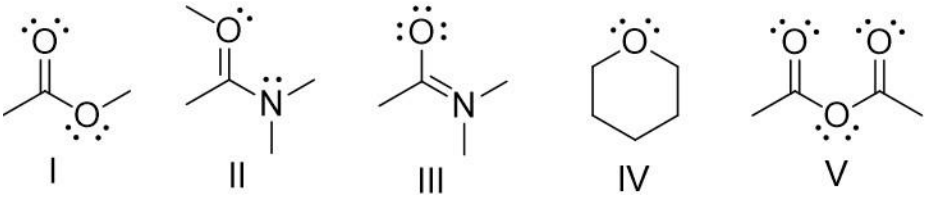
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83) What is the formal charge on the nitrogen atom in the following compound?



A) +1
B) +2
C) -1
D) -2
E) 0
Answer: E
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

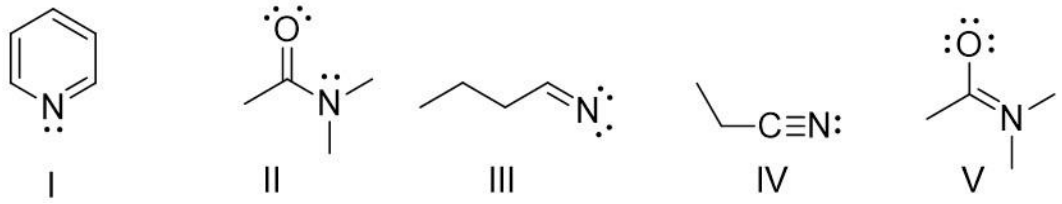
84) Which of the following structures have +1 as a formal charge on an oxygen atom?



A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

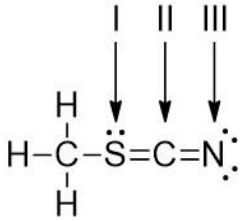
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85) Which of the following structures have +1 as a formal charge on the nitrogen atom?



A) I
B) II
C) III
D) IV
E) V
Answer: E
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

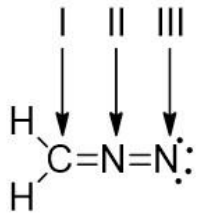
86) Determine the formal charge on each atom as indicated for the structure below.



A) I = +1; II = 0; III = -1
B) I = -1; II = +1; III = 0
C) I = 0; II = -1; III = +1
D) I = -1; II = 0; III = +1
E) I = +1; II = 0; III = +1
Answer: A
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

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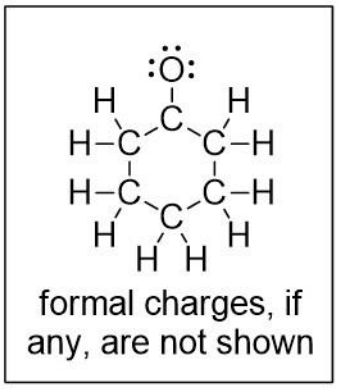
87) Diazomethane has the molecular formula CH_2N_2. Determine the formal charge on each atom as indicated for the structure below.

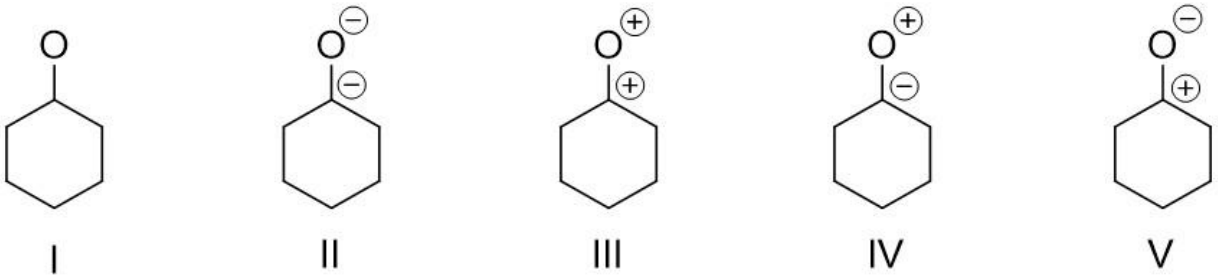


A) I = -1; II = +1; III = 0
B) I = +1; II = 0; III = -1
C) I = 0; II = -1; III = +1
D) I = 0; II = +1; III = -1
E) I = 0; II = +1; III = 0
Answer: D
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

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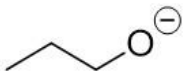
88) Consider the structure in the box, and then identify the bond-line representation, with appropriate formal charges if needed, from the options provided.





A) I
B) II
C) III
D) IV
E) V
Answer: E
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

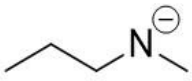
89) How many lone pairs of electrons are on the oxygen atom?



A) one
B) two
C) three
D) four
E) none
Answer: C
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

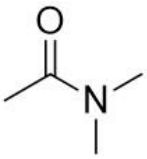
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90) How many lone pairs of electrons are on the nitrogen atom?



A) one
B) two
C) three
D) four
E) none
Answer: B
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

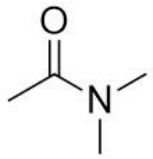
91) How many lone pairs of electrons are on the oxygen atom?



A) one
B) two
C) three
D) four
E) none
Answer: B
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

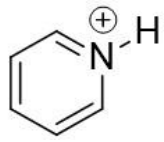
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92) How many lone pairs of electrons are on the nitrogen atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

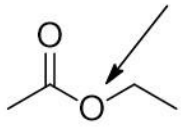
93) How many lone pairs of electrons are on the nitrogen atom?



A) one
B) two
C) three
D) four
E) none
Answer: E
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

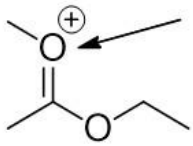
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94) How many lone pairs of electrons are on the indicated oxygen atom?



A) one
B) two
C) three
D) four
E) none
Answer: B
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

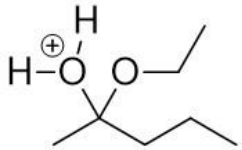
95) How many lone pairs of electrons are on the indicated oxygen atom?



A) one
B) two
C) three
D) four
E) none
Answer: A
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

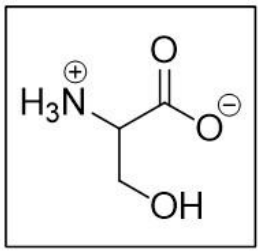
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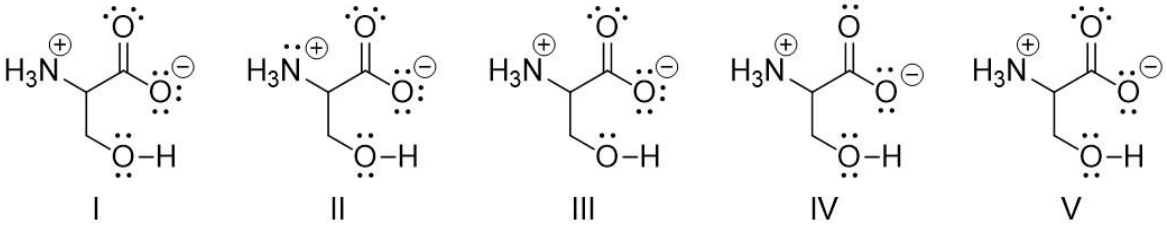
96) How many total lone pairs of electrons are in the following compound?



A) one
B) two
C) three
D) four
E) none
Answer: C
Diff: 1
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

97) Identify the structure that shows the correct placement of all lone pairs for the compound illustrated in the box below.

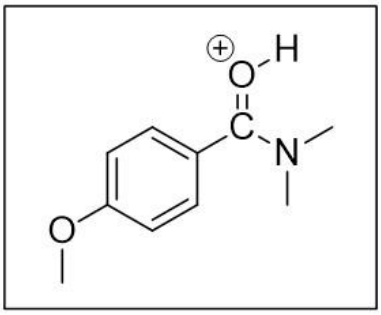


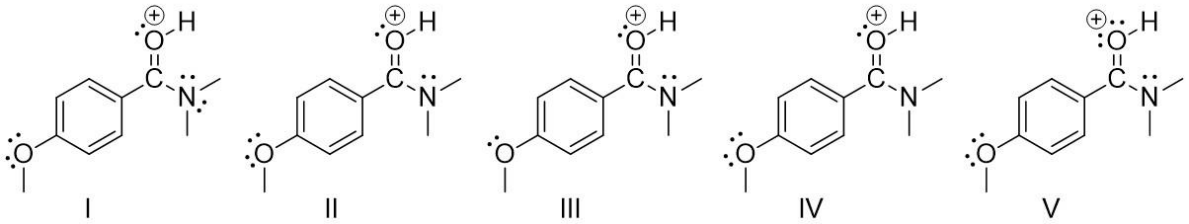


A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

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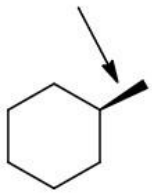
98) Identify the structure that shows the correct placement of all lone pairs for the compound illustrated in the box below.





A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 2
Learning Objective: 2.5 Describe the relationship between the number of bonds, the number of lone pairs, and formal charge for oxygen and nitrogen atoms

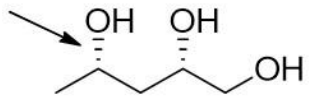
99) The representation of the indicated bond in the following compound is _____ of the paper.



A) in the plane
B) out of the plane
C) behind the plane
D) None of these
Answer: B
Diff: 1
Learning Objective: 2.6 Describe how wedges and dashes are used to indicate three-dimensional molecular structure

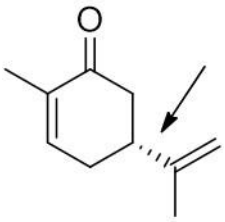
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100) The representation of the indicated bond in the following compound is _____ of the paper.



A) in the plane
B) out of the plane
C) behind the plane
D) None of these
Answer: C
Diff: 1
Learning Objective: 2.6 Describe how wedges and dashes are used to indicate three-dimensional molecular structure

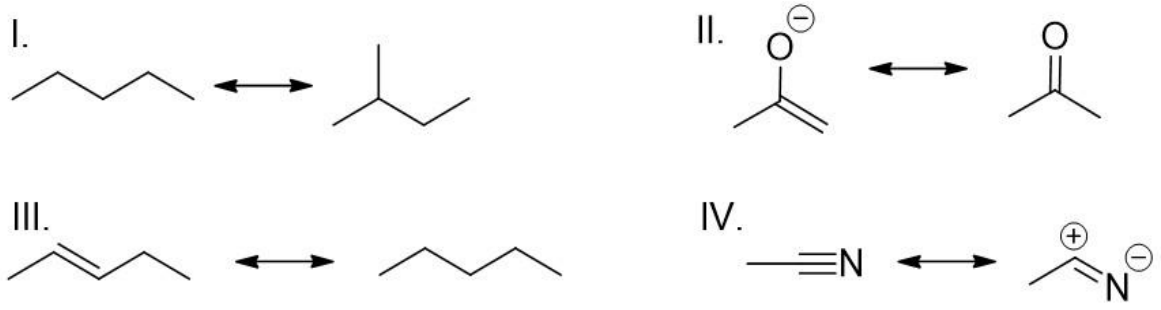
101) The representation of the indicated bond in the following compound is _____ of the paper.



A) in the plane
B) out of the plane
C) behind the plane
D) None of these
Answer: C
Diff: 1
Learning Objective: 2.6 Describe how wedges and dashes are used to indicate three-dimensional molecular structure

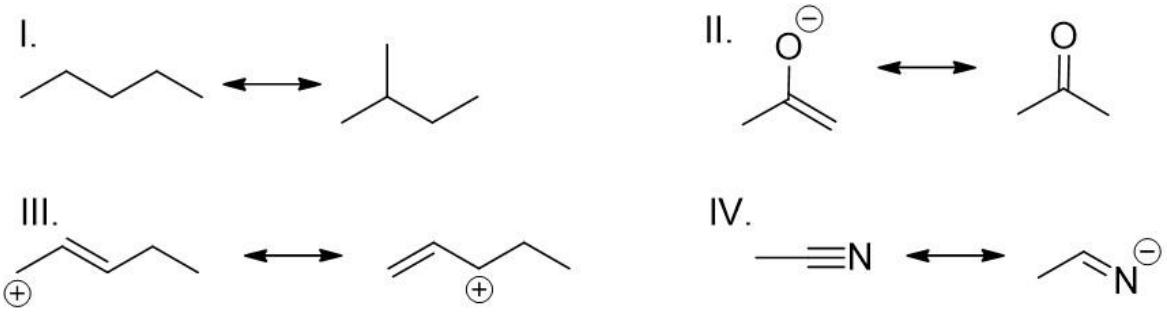
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102) Which of the following pairs are resonance structures of each other?



A) I
B) II
C) III
D) IV
E) II and IV
Answer: D
Diff: 1
Learning Objective: 2.7 Define "resonance", describing the relationship between resonance and molecular orbital theory

103) Which of the following pairs are resonance structures of each other?



A) I
B) II
C) III
D) IV
E) II and IV
Answer: C
Diff: 1
Learning Objective: 2.7 Define "resonance", describing the relationship between resonance and molecular orbital theory

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104) The spreading of electrons over two or more atoms in a compound is called _____.
A) isomerism
B) delocalization
C) stereoisomerism
D) localization
E) None of these
Answer: B
Diff: 1
Learning Objective: 2.7 Define "resonance", describing the relationship between resonance and molecular orbital theory

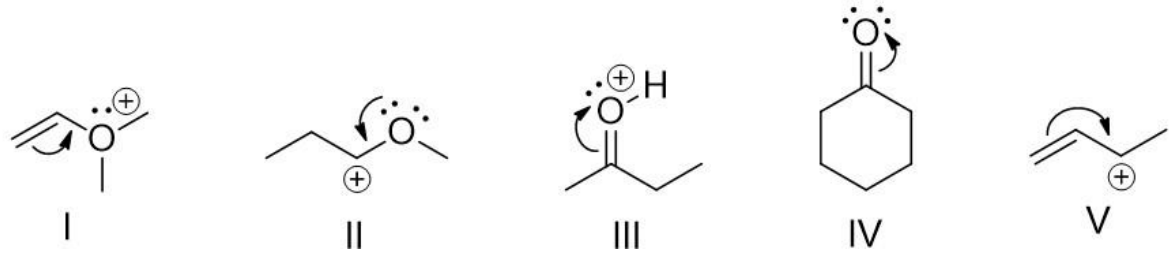
105) Delocalization of electrons over two or more atoms _____ a molecule.
A) destabilizes
B) delocalizes
C) localizes
D) stabilizes
E) None of these
Answer: D
Diff: 1
Learning Objective: 2.7 Define "resonance", describing the relationship between resonance and molecular orbital theory

106) Resonance structures have _____ connectivity of atoms and _____ distribution of electrons.
A) different, the same
B) the same, the same
C) different, different
D) the same, different
E) None of these
Answer: A
Diff: 2
Learning Objective: 2.7 Define "resonance", describing the relationship between resonance and molecular orbital theory

107) Which statement best describes a resonance hybrid?
A) The process of dealing with the inadequacy of bond-line structures.
B) A structure showing an allyl carbocation.
C) A representation of a molecule showing all the bonds and lone pairs.
D) Molecules with the same molecular formula, but different atom connectivity.
E) A representation of a molecule that can alternatively be represented by drawing two or more resonance structures.
Answer: E
Diff: 2
Learning Objective: 2.7 Define "resonance", describing the relationship between resonance and molecular orbital theory

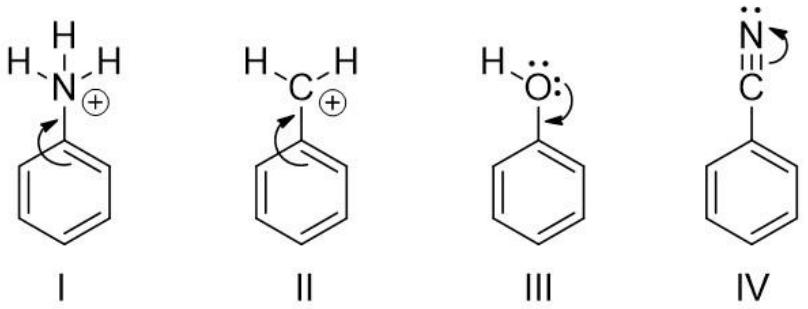
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108) Which of the following violates the rules for curved arrows?



A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 1
Learning Objective: 2.8 Demonstrate the used of curved arrows in drawing resonance structures, stating the two rules to be applied when drawing curved arrows

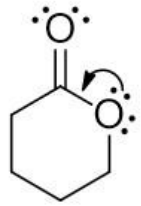
109) Which of the following violates the rules for curved arrows?



A) I
B) I and II
C) I and III
D) II and III
E) III and IV
Answer: C
Diff: 1
Learning Objective: 2.8 Demonstrate the used of curved arrows in drawing resonance structures, stating the two rules to be applied when drawing curved arrows

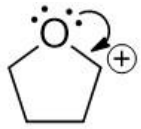
Organic Chemistry 4th edition Klein Test Bank

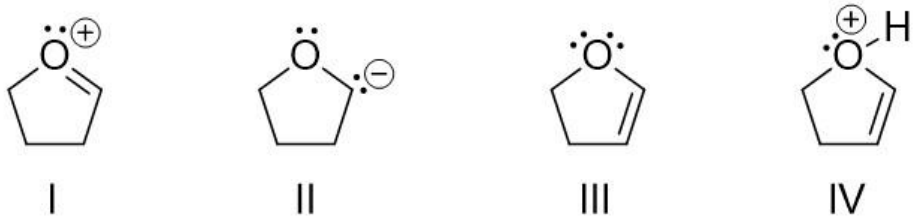
110) Why is the single curved arrow shown insufficient to draw a resonance structure?



A) The resulting structure would have a positive on the most electronegative atom.
B) The resulting structure would have an octet rule violation.
C) The resulting structure would have a negative on the most electronegative atom.
D) The resulting structure would have a negative on the least electronegative atom.
E) The resulting structure would have an atom with less than an octet.
Answer: B
Diff: 2
Learning Objective: 2.8 Demonstrate the used of curved arrows in drawing resonance structures, stating the two rules to be applied when drawing curved arrows

111) Identify the resulting resonance structure(s) indicated by the curved arrow.

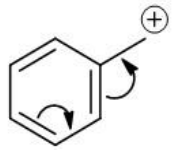


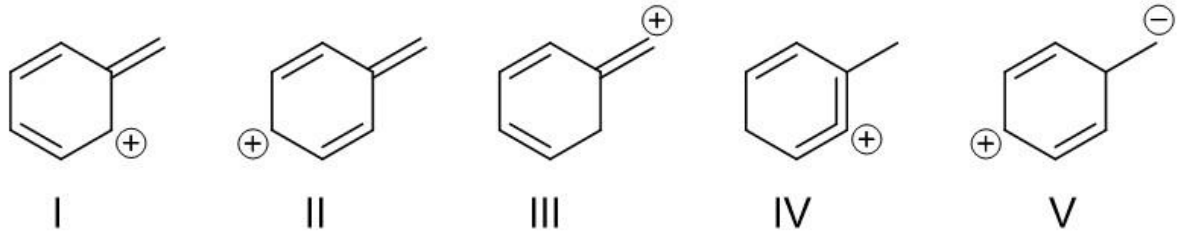


A) I
B) II
C) III
D) IV
E) I and III
Answer: A
Diff: 2
Learning Objective: 2.9 Describe the use of arrow pushing and formal charges in resonance structures

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112) Identify the resulting resonance structure indicated by the curved arrows.

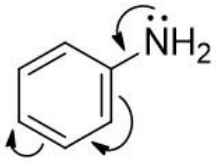


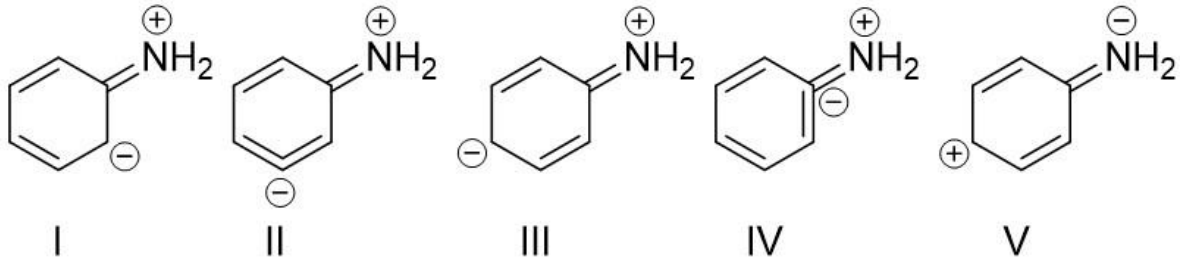


A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 2
Learning Objective: 2.9 Describe the use of arrow pushing and formal charges in resonance structures

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113) Identify the resulting resonance structure indicated by the curved arrows.

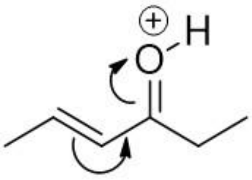


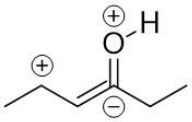


A) I
B) II
C) III
D) IV
E) V
Answer: C
Diff: 2
Learning Objective: 2.9 Describe the use of arrow pushing and formal charges in resonance structures

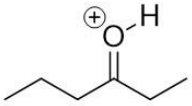
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114) Identify the resulting resonance structure indicated by the curved arrows.

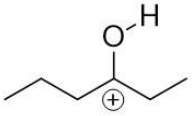




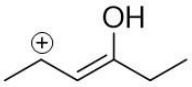
I



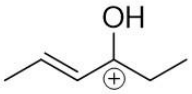
II



III



IV

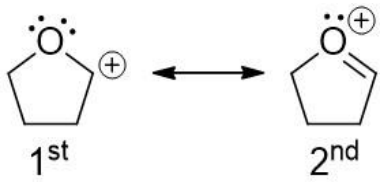


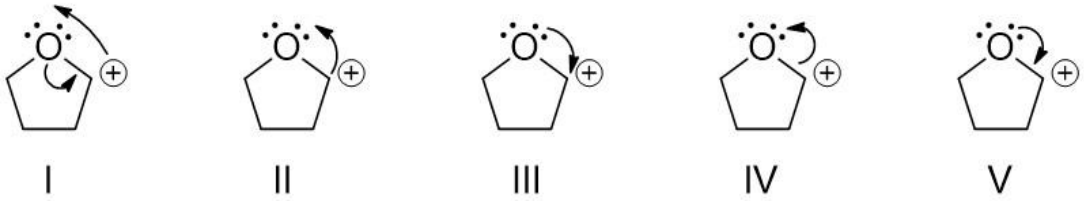
V

A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 2
Learning Objective: 2.9 Describe the use of arrow pushing and formal charges in resonance structures

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115) Identify the proper curved arrow to convert the first resonance structure into the second resonance structure.

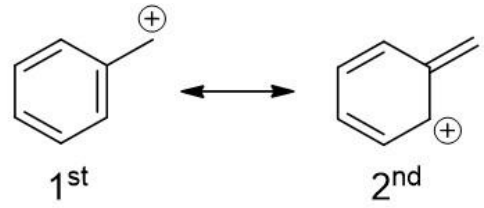


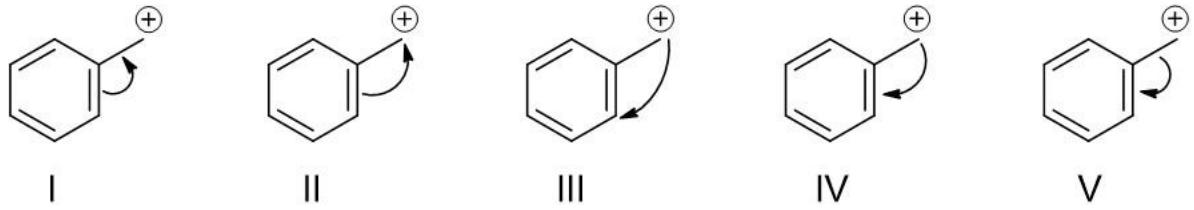


A) I
B) II
C) III
D) IV
E) V
Answer: E
Diff: 2
Learning Objective: 2.9 Describe the use of arrow pushing and formal charges in resonance structures

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116) Identify from the options given the proper curved arrow to convert the first resonance structure into the second resonance structure.

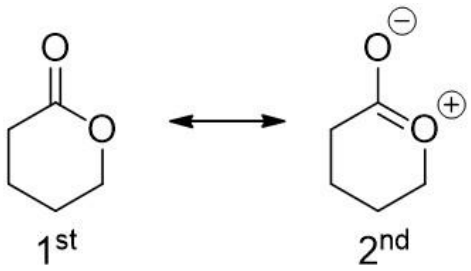


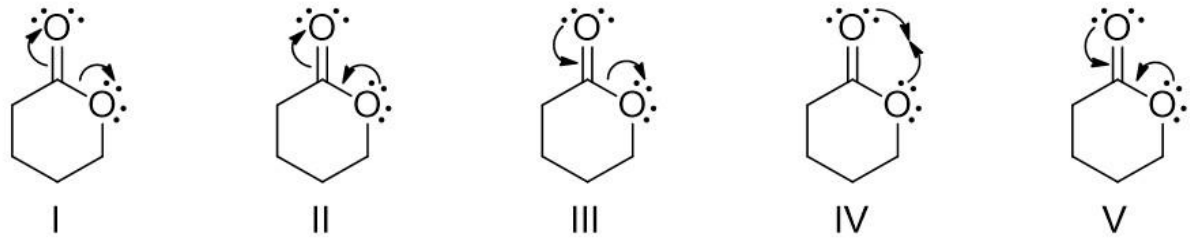


A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 2
Learning Objective: 2.9 Describe the use of arrow pushing and formal charges in resonance structures

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117) Identify from the options given the proper curved arrows to convert the first resonance structure into the second resonance structure.

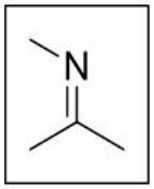


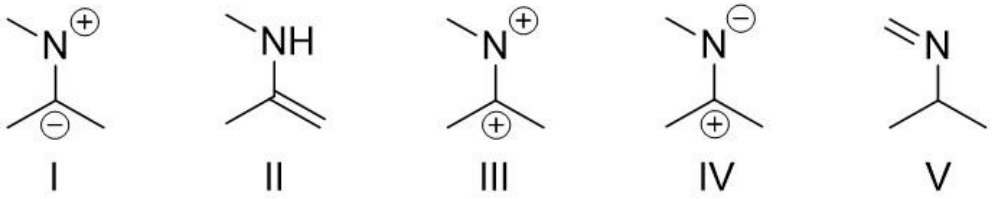


A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 2
Learning Objective: 2.9 Describe the use of arrow pushing and formal charges in resonance structures

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118) For the structure shown in the box below identify a corresponding correct resonance structure.

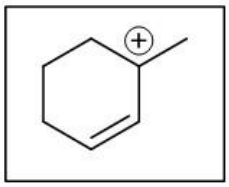


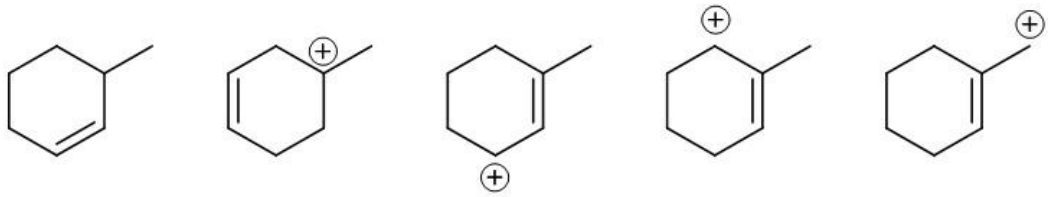


A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 2
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

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119) For the structure shown in the box below identify a corresponding correct resonance structure.

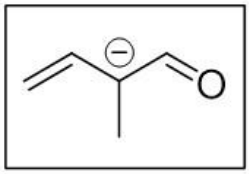


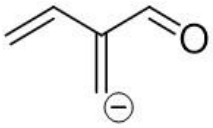


A) I
B) II
C) III
D) IV
E) V
Answer: C
Diff: 1
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

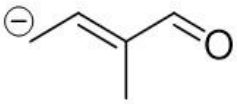
Organic Chemistry 4th edition Klein Test Bank

120) For the structure shown in the box below identify corresponding correct resonance structures.

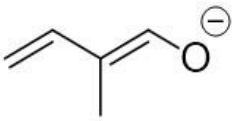




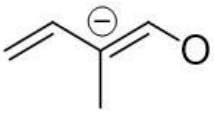
I



II



III

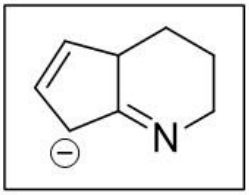


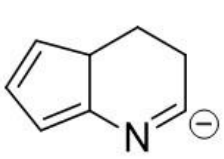
IV

A) I and II
B) II and III
C) III and IV
D) I and III
E) II and IV
Answer: B
Diff: 2
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

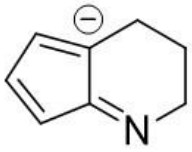
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121) For the structure shown in the box below identify corresponding correct resonance structures.

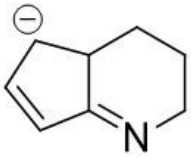




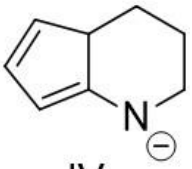
I



II



III

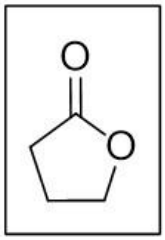


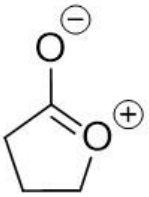
IV

A) I and II
B) II and III
C) III and IV
D) I and III
E) II and IV
Answer: C
Diff: 2
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

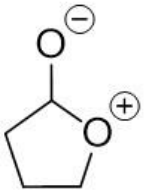
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122) For the structure shown in the box below identify a corresponding correct resonance structure.

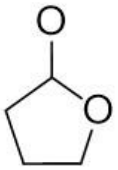




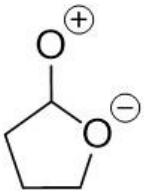
I



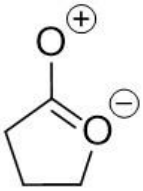
II



III



IV

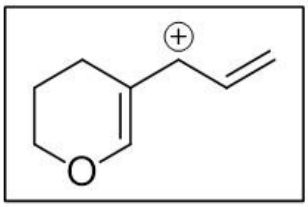


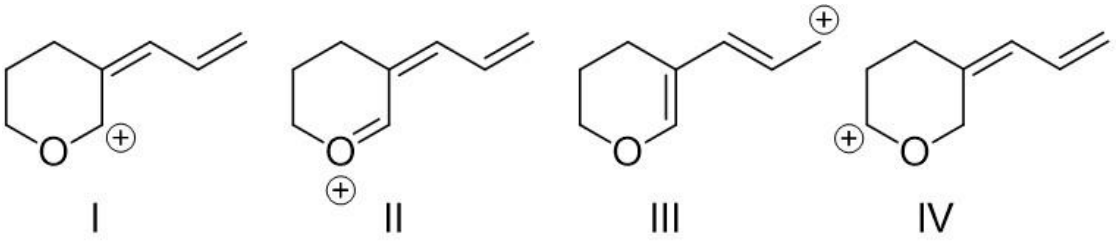
V

A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 2
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

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123) For the structure shown in the box below identify corresponding correct resonance structures.

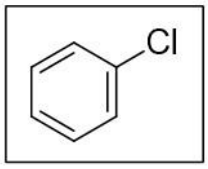


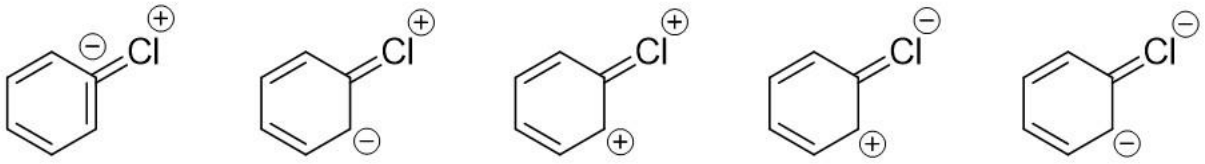


A) I and II
B) II and III
C) III and IV
D) I, II and III
E) II, III and IV
Answer: D
Diff: 3
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

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124) For the structure shown in the box below identify a corresponding correct resonance structure.



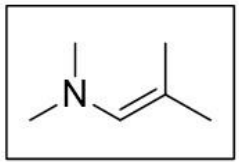


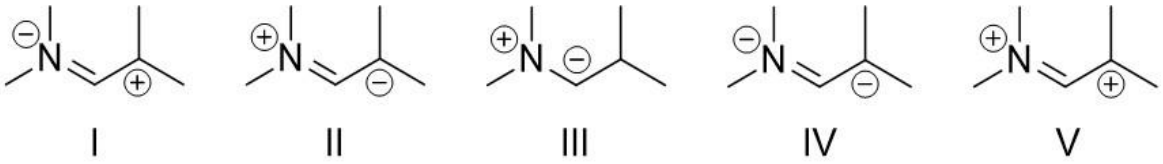
I II III IV V

A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 1
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

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125) For the structure shown in the box below identify a corresponding correct resonance structure.

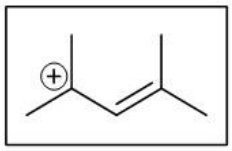


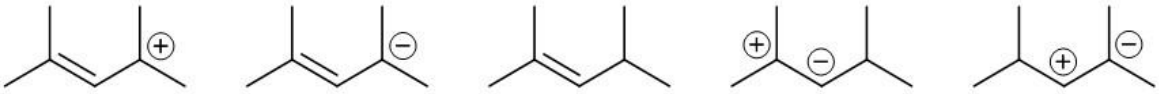


A) I
B) II
C) III
D) IV
E) V
Answer: B
Diff: 1
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

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126) For the structure shown in the box below identify a corresponding correct resonance structure.

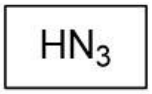




I II III IV V

A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 1
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

127) For the compound shown in the box below identify two corresponding correct resonance structures.



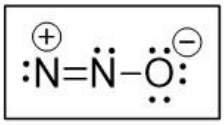


I II III IV

A) I and II
B) II and III
C) III and IV
D) I and III
E) II and IV
Answer: D
Diff: 3
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

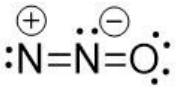
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128) For the structure shown in the box below identify two corresponding correct resonance structures.

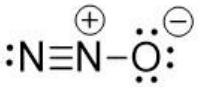




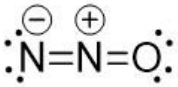
I



II



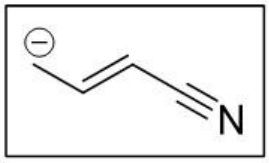
III

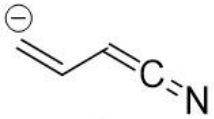


IV

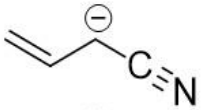
A) I and II
B) II and III
C) III and IV
D) I and III
E) II and IV
Answer: C
Diff: 3
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

129) For the structure shown in the box below identify two corresponding correct resonance structures.

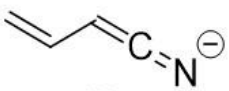




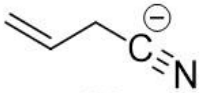
I



II



III

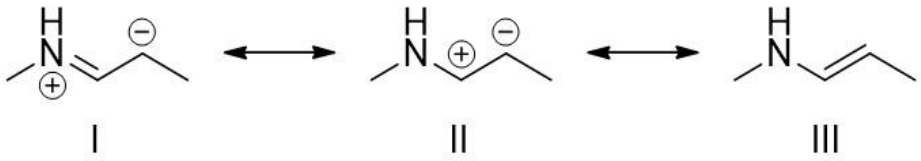


IV

A) I and II
B) II and III
C) III and IV
D) I and III
E) II and IV
Answer: B
Diff: 3
Learning Objective: 2.10 Identify resonance structures by naming the five different structural patterns in molecules

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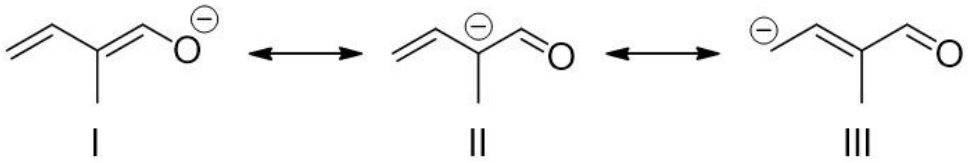
130) Identify the most significant resonance structure(s).



I II III

A) I
B) II
C) III
D) I and III
E) II and III
Answer: C
Diff: 1
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

131) Identify the most significant resonance structure(s).

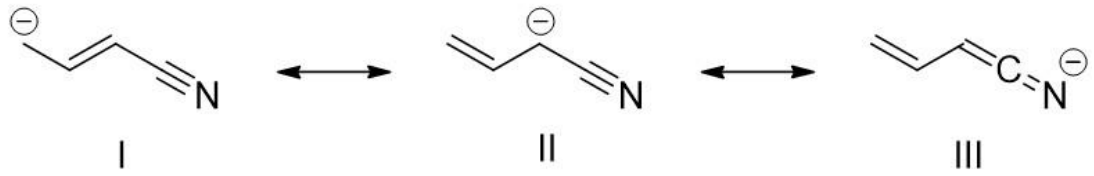


I II III

A) I
B) II
C) III
D) I and II
E) II and III
Answer: A
Diff: 1
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

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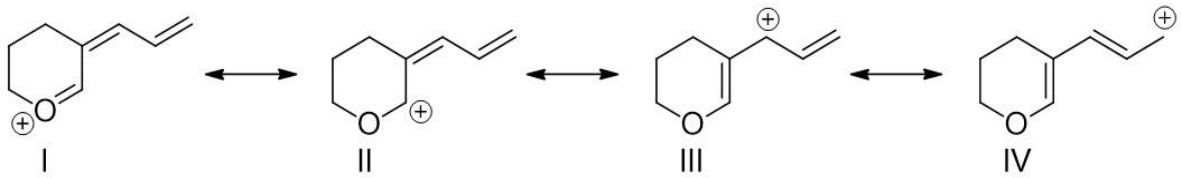
132) Identify the most significant resonance structure(s).



I II III

A) I
B) II
C) III
D) I and II
E) II and III
Answer: C
Diff: 2
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

133) Identify the most significant resonance structure(s).



I II III IV

A) I
B) II
C) III
D) I and II
E) III and IV
Answer: A
Diff: 3
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

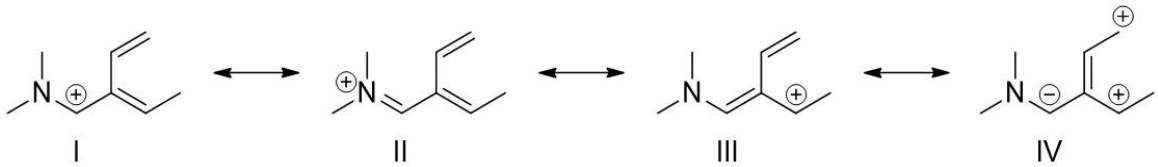
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134) Identify the most significant resonance structure(s).



A) I
B) II
C) III
D) IV
E) All structures are of equal significance
Answer: C
Diff: 2
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

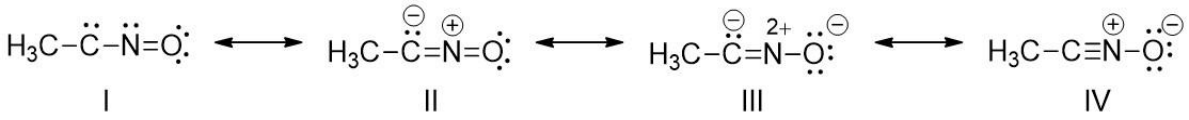
135) Identify the most significant resonance structure(s).



A) I
B) II
C) III
D) IV
E) All structures are of equal significance
Answer: B
Diff: 2
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

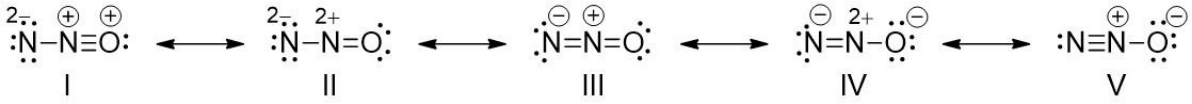
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136) Identify the most significant resonance structure(s).



A) I
B) II
C) III
D) IV
E) II and IV
Answer: D
Diff: 3
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

137) Identify the most significant resonance structure.



A) I
B) II
C) III
D) IV
E) V
Answer: E
Diff: 2
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

138) What is the relationship between the following structures?



A) constitutional isomers
B) resonance structures
C) conformers
D) identical compounds
E) conjugate acid and conjugate base
Answer: B
Diff: 1
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

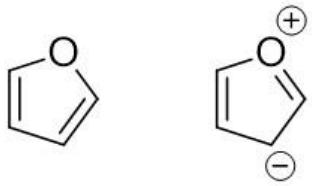
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139) What is the relationship between the following structures?



A) constitutional isomers
B) resonance structures
C) conformers
D) identical compounds
E) stereoisomers
Answer: A
Diff: 1
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

140) What is the relationship between the following structures?



A) constitutional isomers
B) resonance structures
C) conformers
D) identical compounds
E) different compounds
Answer: B
Diff: 1
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

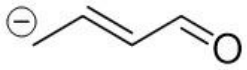
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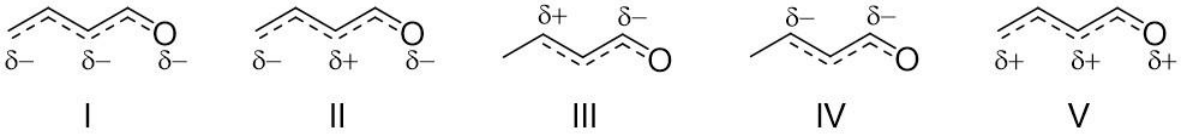
141) What is the relationship between the following structures?



A) constitutional isomers
B) resonance structures
C) conformers
D) identical compounds
E) different compounds
Answer: B
Diff: 1
Learning Objective: 2.11 Distinguish between significant and insignificant resonance structures, describing how the significance of resonance is determined

142) Identify the resonance hybrid for the following compound.

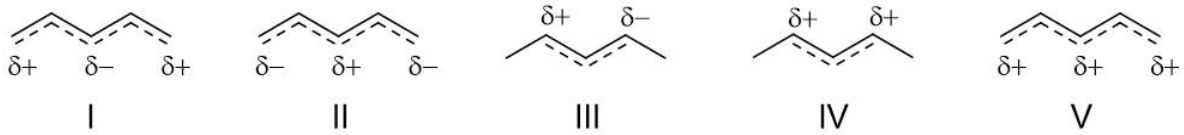




A) I
B) II
C) III
D) IV
E) V
Answer: A
Diff: 2
Learning Objective: 2.12 Draw a resonance hybrid using partial bonds and partial charges, reflecting the combination of individual resonance structures

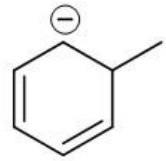
Organic Chemistry 4th edition Klein Test Bank

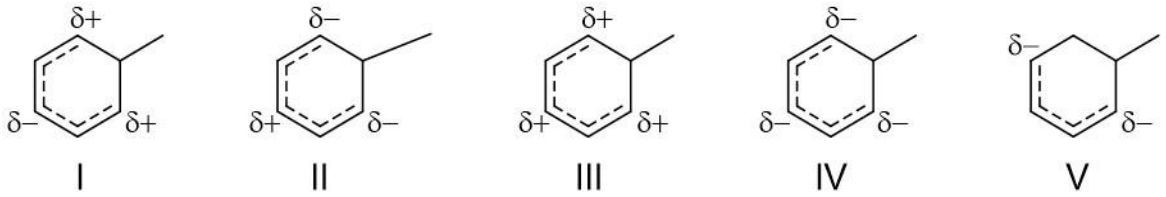
143) Identify the resonance hybrid for CH_2=CHCH=$CHCH_2^+$.



A) I
B) II
C) III
D) IV
E) V
Answer: E
Diff: 2
Learning Objective: 2.12 Draw a resonance hybrid using partial bonds and partial charges, reflecting the combination of individual resonance structures

144) Identify the resonance hybrid for the following compound.

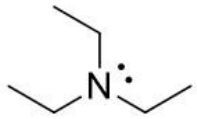




A) I
B) II
C) III
D) IV
E) V
Answer: D
Diff: 2
Learning Objective: 2.12 Draw a resonance hybrid using partial bonds and partial charges, reflecting the combination of individual resonance structures

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145) The lone pair on the nitrogen atom in the following compound is _____.



A) localized
B) delocalized
C) conjugated
D) resonance stabilized
E) unhybridized
Answer: A
Diff: 1
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

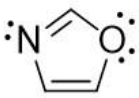
146) The lone pairs on the oxygen in the following compound are best described _____.



A) both localized
B) both delocalized
C) one localized and one delocalized
D) unhybridized
E) allylic to each other
Answer: C
Diff: 1
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

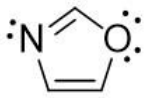
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147) The lone pair on the nitrogen atom in the following compound is _____.



A) localized
B) delocalized
C) conjugated
D) resonance stabilized
E) unhybridized
Answer: A
Diff: 1
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

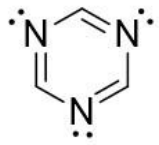
148) The lone pairs on the oxygen atom in the following compound are best described as _____.



A) both localized
B) both delocalized
C) one localized and one delocalized
D) unhybridized
E) allylic to each other
Answer: C
Diff: 1
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

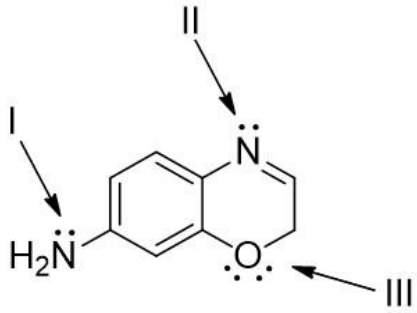
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149) The lone pairs on the nitrogen atoms in the following compound are best described as _____.



A) all three pairs localized
B) all three pairs delocalized
C) two localized pairs and one delocalized pair
D) one localized pair and two delocalized pairs
E) unhybridized
Answer: A
Diff: 1
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

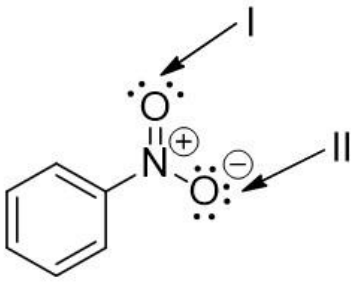
150) For the following compound, identify the indicated lone pairs as localized or delocalized.



A) I = localized; II = delocalized; III = one localized and one delocalized
B) I = delocalized; II = localized; III = one localized and one delocalized
C) I = localized; II = delocalized; III = both delocalized
D) I = delocalized; II = localized; III = both localized
E) I = delocalized; II = delocalized; III = one localized and one delocalized
Answer: B
Diff: 2
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

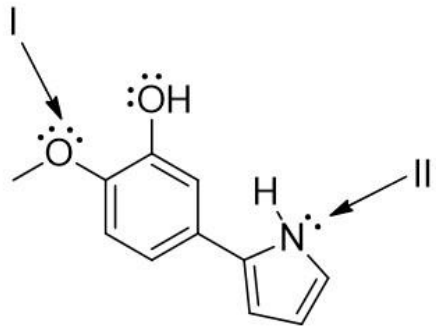
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151) For the following compound, identify the indicated lone pairs as localized or delocalized.



A) I = both delocalized; II = two localized and one delocalized
B) I = both localized; II = two localized and one delocalized
C) I = both localized; II = one localized and two delocalized
D) I = one localized and one delocalized; II = one localized and two delocalized
E) I = one localized and one delocalized; II = two localized and one delocalized
Answer: B
Diff: 2
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

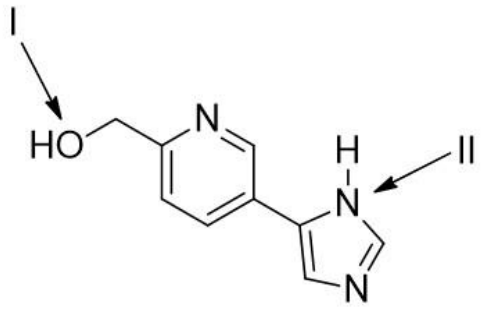
152) For the following compound, identify the indicated lone pairs as localized or delocalized.



A) I = both delocalized; II = localized
B) I = both localized; II = localized
C) I = both delocalized; II = delocalized
D) I = one localized and one delocalized; II = localized
E) I = one localized and one delocalized; II = delocalized
Answer: E
Diff: 2
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

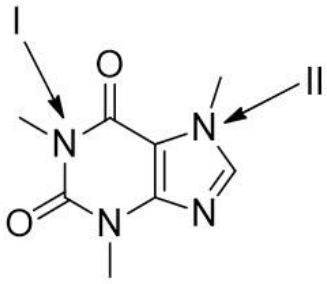
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153) For the following compound what is the hybridization state and molecular geometry at the indicated atoms?



A) I = sp^3, tetrahedral; II = sp^2, trigonal pyramidal
B) I = sp^3, bent; II = sp^2, trigonal planar
C) I = sp^3, bent; II = sp^2, trigonal pyramidal
D) I = sp^3, tetrahedral; II = sp^2, trigonal planar
E) I = sp^2, trigonal pyramidal; II = sp, trigonal planar
Answer: B
Diff: 3
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

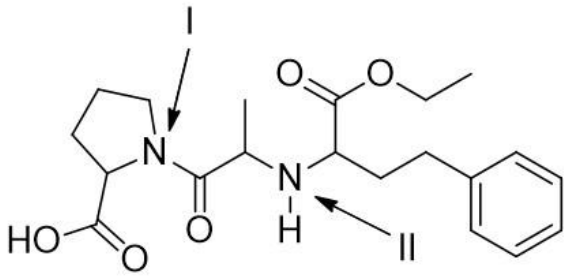
154) Caffeine has the following structure. Identify the hybridization state and molecular geometry at the indicated atoms.



A) I = sp^3, trigonal pyramidal; II = sp^3, trigonal pyramidal
B) I = sp^3, trigonal planar; II = sp^3, trigonal planar
C) I = sp^2, trigonal pyramidal; II = sp^2, trigonal pyramidal
D) I = sp^2, trigonal planar; II = sp^2, trigonal planar
E) I = sp^3, trigonal pyramidal; II = sp^2, trigonal planar
Answer: D
Diff: 3
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

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155) Enalapril, is a drug used in the treatment of heart disease. What is the hybridization state at the indicated atoms in Enalapril?



A) I = sp^2, trigonal planar; II = sp^3, trigonal pyramidal
B) I = sp^3, trigonal pyramidal; II = sp^3, trigonal pyramidal
C) I = sp^2, trigonal pyramidal; II = sp^2, trigonal pyramidal
D) I = sp^2, trigonal planar; II = sp^2, trigonal planar
E) I = sp^3, trigonal pyramidal; II = sp^2, trigonal planar
Answer: A
Diff: 3
Learning Objective: 2.13 Distinguish between delocalized and localized lone pairs and describe how delocalized lone pairs participate in resonance and why localized lone pairs do not participate in resonance

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