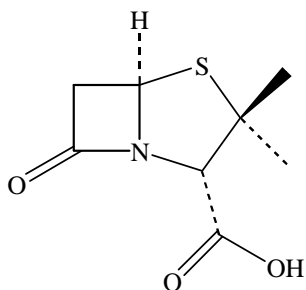


1. In the reaction of penicillic acid with base, which of the following occurs?

A



Penicillic Acid

- a) A polar covalent bond is broken
b) A new pi bond is formed
c) An ionic bond is broken
d) a & c
e) None of these

2. Which of the following compounds contains a cis alkene? *Note: Pi bonds of benzene rings are not alkenes.*

C

<p>a)</p> <p>Pentazocine (narcotic analgesic)</p>	<p>b)</p> <p>Isoeugenol (vanilla flavoring)</p>
<p>c)</p> <p>Idrocilamide (Skeletal muscle relaxant)</p>	<p>d)</p> <p>Buformin (Anti-diabetic)</p>
<p>e) None of these</p>	

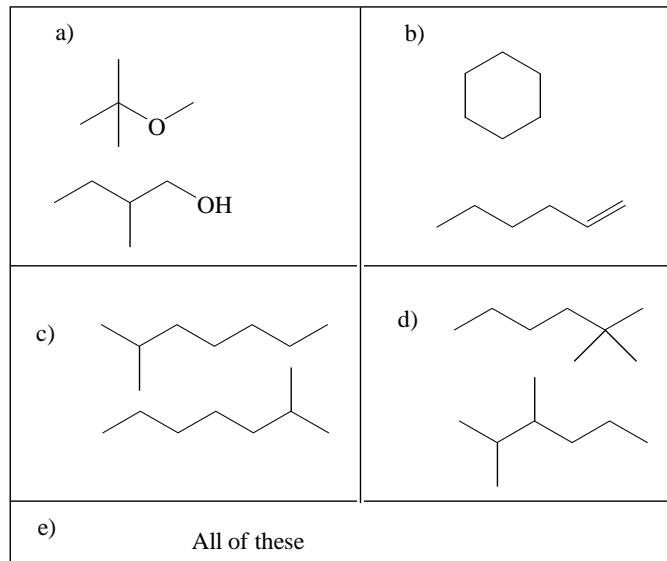
3. An atom with the electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ will tend

B

- a) to form two covalent bonds to two Cl atoms
b) to form two ionic bonds to two Cl atoms
c) to form two covalent bonds with C
d) to form two ionic bonds with C
e) to form two pi bonds with C

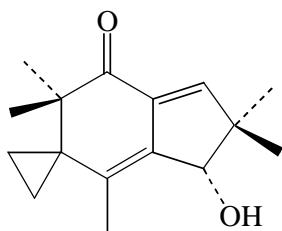
4. Which of the following pairs of compounds represent skeletal isomers?

D



5. What is the degree of unsaturation of illudin M ?

E

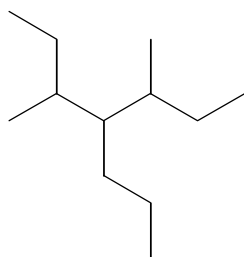


Illudin M

- | |
|-------------|
| a) tertiary |
| b) 3 |
| c) 4 |
| d) 5 |
| e) 6 |

6. The proper IUPAC name(s) of the compound given below is (are):

B



- | |
|--------------------------------------|
| a) 2-ethyl-4-methyl-3-propylhexane |
| b) 3,5-dimethyl-4-propylheptane |
| c) 3-methyl-5-methyl-4-propylheptane |
| d) 3-butyl-2-ethylhexane |
| e) All of these |

7. Which of the following statements is(are) true?

B

- Carbanions tend to form pi bonds.
- Alkanes contain only sigma bonds
- Alkynes contain only pi bonds
- Alkenes contain both pure and polar covalent bonds
- b & c

8. Which atom corresponds to the electron configuration diagram given below?

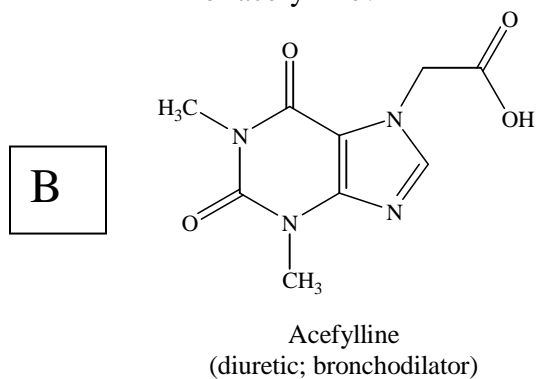
E

↑
E

— — — — —	3d
— — — — —	4s
↑↓ ↑↓ —	3p
↑↓	3s
↑↓ ↑↓ ↑↓	2p
↑↓	2s
↑↓	1s

a) Mg
b) Ar
c) P
d) Si
e) Cl

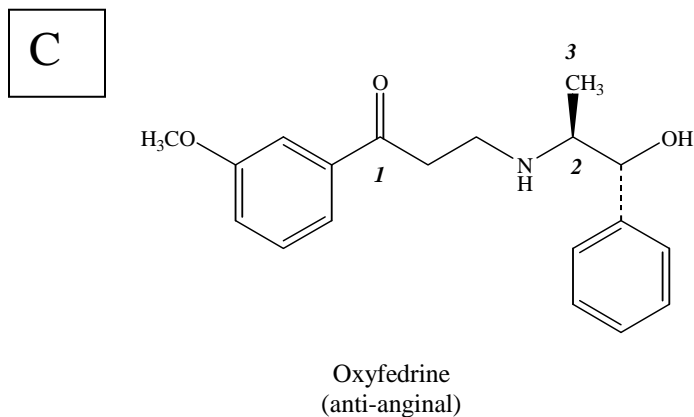
9. Which of the following non-covalent interactions will be associated with the *conjugate base* of acefylline?



1	Intermolecular H-bonds
2	Intramolecular H-bonds
3	Intermolecular Dipole-Dipole
4	Intramolecular Dipole-Dipole
5	Intermolecular Ion-Dipole
6	Intramolecular Ion-Dipole
7	Intermolecular Hydrophobic
8	Intramolecular Hydrophobic

- a) 1, 2, 3, 4
b) 3, 4, 5, 6
c) 5,6,7,8
d) 1, 2, 5, 6
e) 1, 2, 3, 4, 5, 6

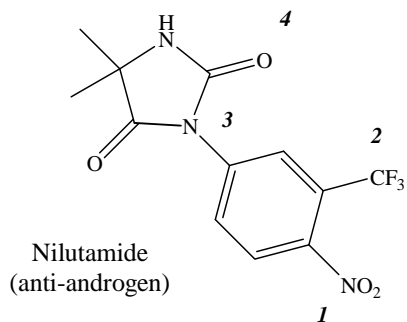
10. What are the correct degrees of alkyl substitution of the C atoms indicated in oxyfedrine?



- a) C₁ primary; C₂ tertiary; C₃ primary
b) C₁ secondary; C₂ tertiary; C₃ primary
c) C₁ secondary; C₂ secondary; C₃ primary
d) C₁ tertiary; C₂ tertiary; C₃ primary
e) C₁ quarternary; C₂ secondary; C₃ secondary

11. What is the hybridization of the indicated atoms in the molecule of nilutamide?

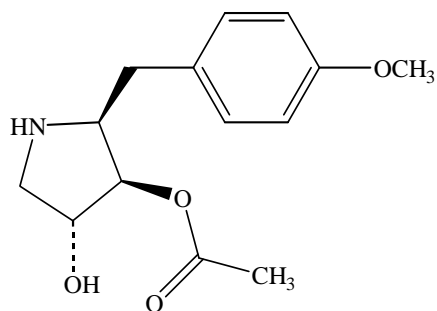
B



- a) sp^3N_1 , sp^3C_2 , sp^3N_3 , sp^2O_4
 b) sp^2N_1 , sp^3C_2 , sp^3N_3 , sp^2O_4
 c) sp^2N_1 , sp^2C_2 , sp^3N_3 , sp^2O_4
 d) sp^3N_1 , sp^3C_2 , sp^2N_3 , sp^2O_4
 e) sp^3N_1 , sp^2C_2 , sp^3N_3 , sp^3O_4

12. The correct molecular formula of anisomycin is:

A

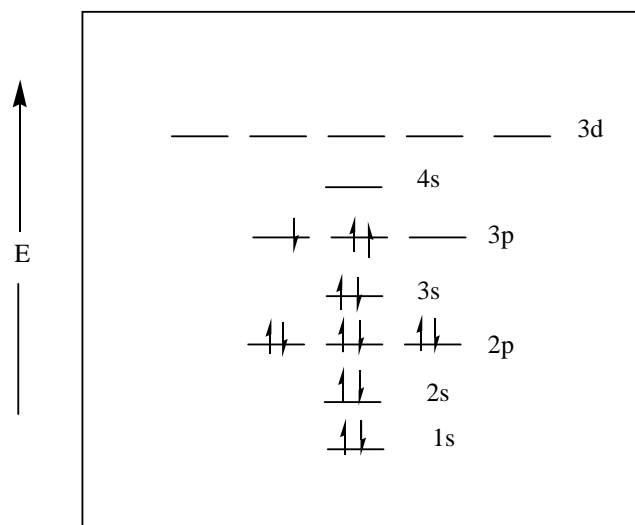


Anisomycin
(antimicrobial)

- a) $C_{14}H_{19}NO_4$
 b) $C_{14}H_{30}NO_4$
 c) $C_{15}H_{19}NO_3$
 d) $C_{12}H_{26}NO_4$
 e) None of these

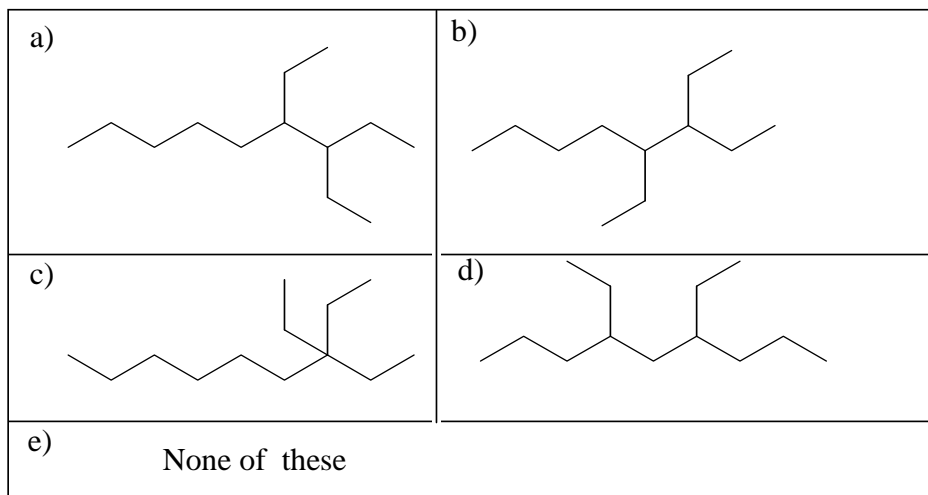
13. Which rule(s) or principle(s) is (are) violated in the electron configuration diagram below?

E



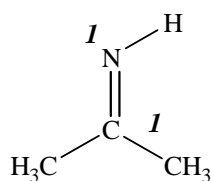
- a) Hund's Rule
 b) Octet Rule
 c) Auf Bau Principle
 d) Pauli Exclusion Principle
 e) a & d

14. Which of the following correctly represents the structure of 3,4-diethyloctane?



B

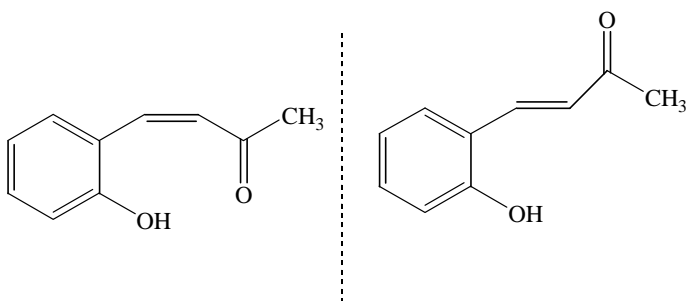
15. Which atomic orbitals of the C₁ and N₁ atoms in the molecule below are used to form the sigma bond between these atoms?



- | |
|---|
| a) N 2p and C 2p |
| b) N 2s and C 2p |
| c) N2sp ² and C 2sp ³ |
| d) N2sp ² and C2sp ² |
| e) N2sp ³ and C 2sp ³ |

D

16. Trans alkenes are usually more stable than cis alkenes. However, the cis alkene of the stereoisomeric pair below is more stable than the trans alkene. A possible explanation for this difference in stability is:

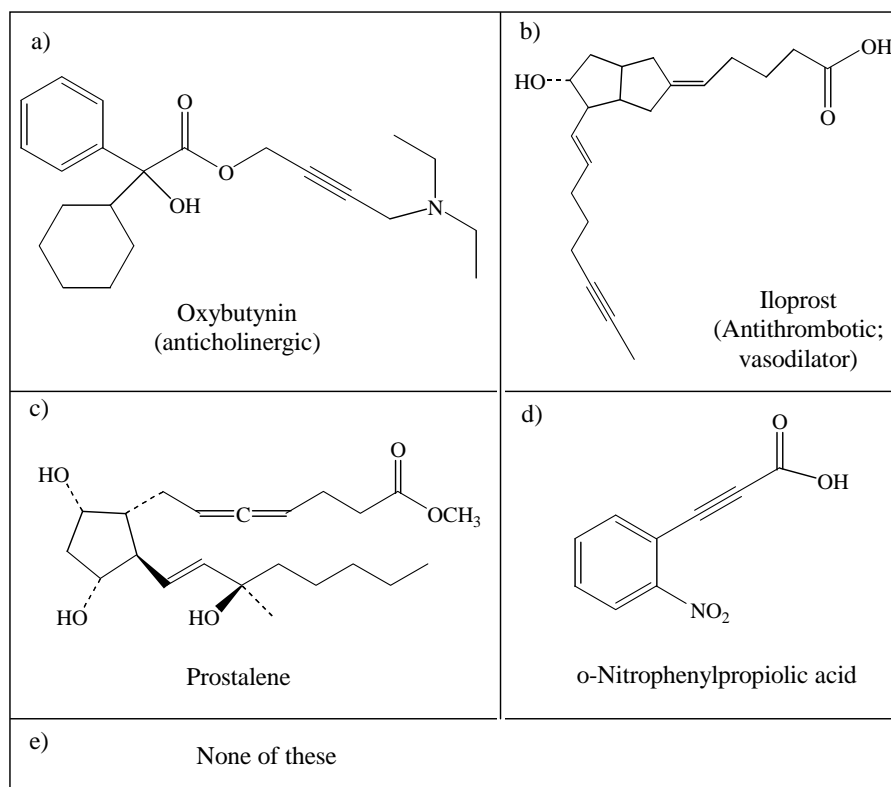


D

- | |
|---|
| a) The cis alkene has a higher degree of unsaturation |
| b) The cis alkene has better p-orbital overlap. |
| c) The cis alkene has more polar covalent bonds |
| d) The cis alkene can form intramolecular H-bonds |
| e) b & d |

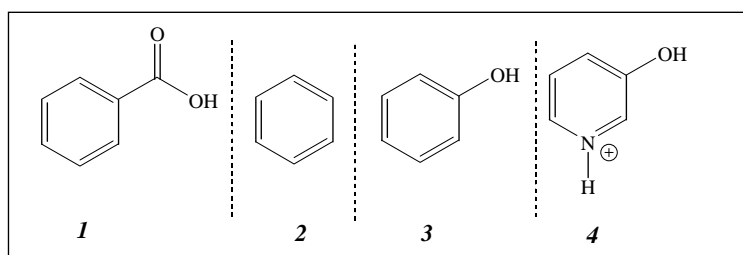
17. Which of the following molecules contains a terminal alkyne?

E



18. Rank the following compounds in order of increasing polarity (least polar --> most polar).

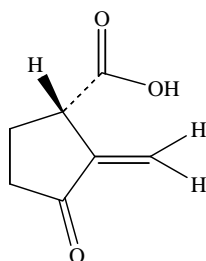
D



- | |
|---------------|
| a) 1, 4, 3, 2 |
| b) 4, 1, 3, 2 |
| c) 4, 3, 1, 2 |
| d) 2, 3, 1, 4 |
| e) 3, 1, 4, 2 |

19. The alkene in sarkomycin A is

C

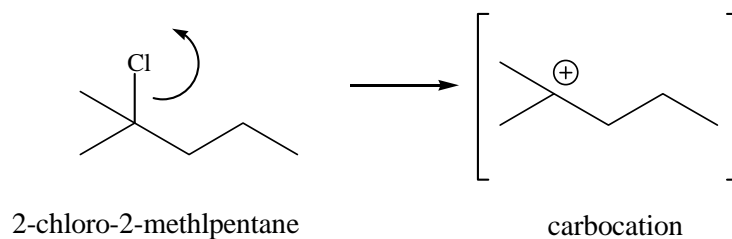


Sarkomycin A

- | |
|---------------------|
| a) unsubstituted |
| b) monosubstituted |
| c) disubstituted |
| d) trisubstituted |
| e) tetrasubstituted |

20. When the C-Cl bond of 2-chloro-2-methylpentane is broken a carbocation is generated. (See scheme given below). Which of the following statements is true as they relate to this reaction?

E



- a) The carbocation carbon has 3 sigma bonds and a vacant p-orbital.
- b) The C atom bonded to the Cl in 2-chloro-2-methylpentane is sp^3 hybridized.
- c) The carbocation carbon is sp^2 hybridized.
- d) b & c
- e) a, b & c