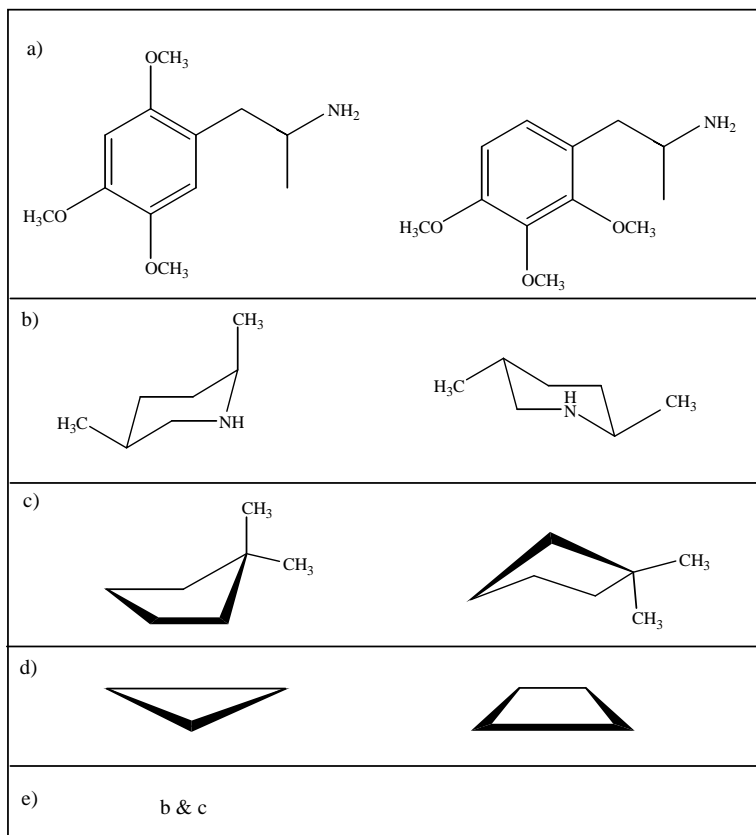


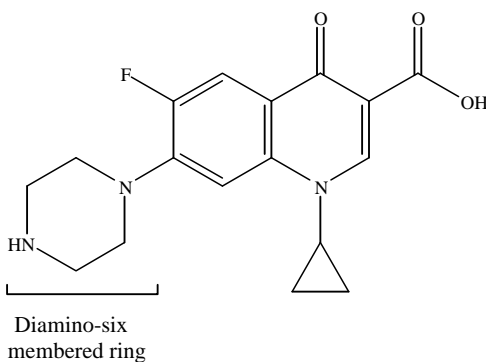
1. Which of the following pairs of compounds represent conformational isomers?

C



2. Which of the following statements is true about ciprofloxacin, an antibiotic?

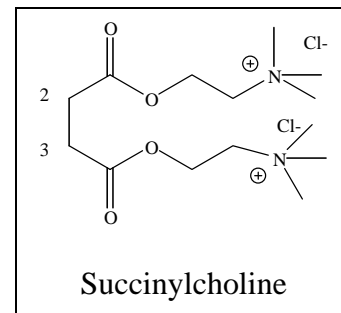
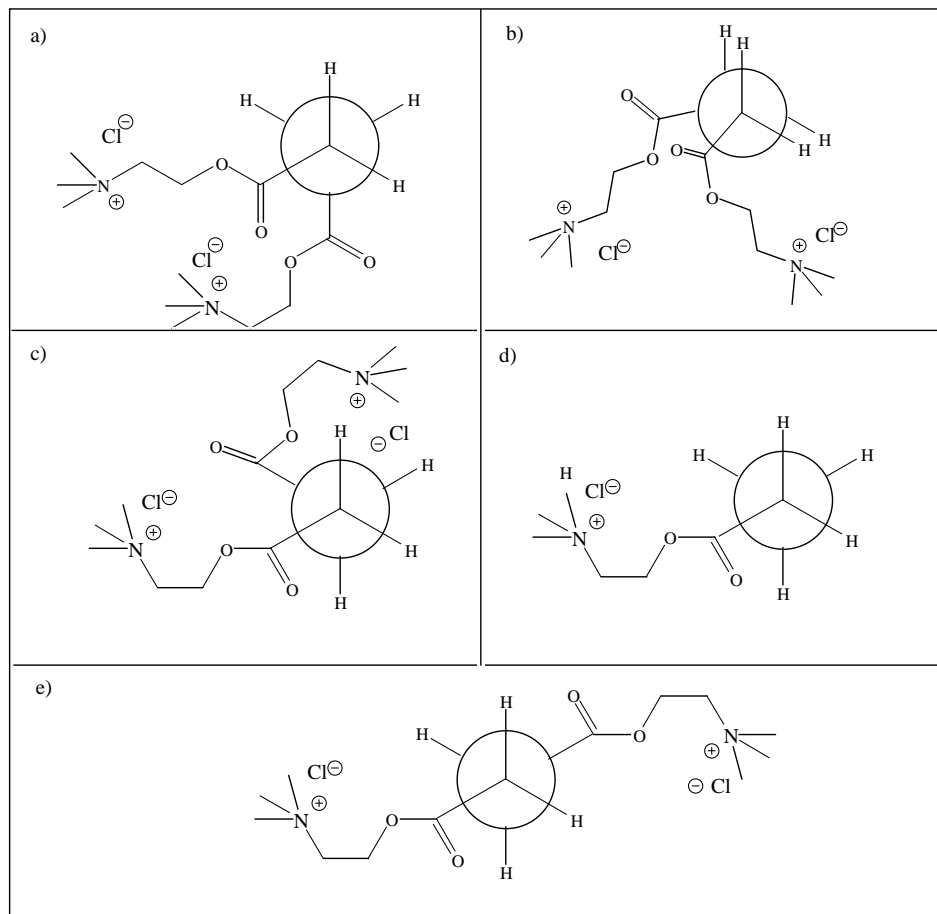
A



- a) The weakest base will be more ionized in the stomach (pH ~2) than in the intestine (pH ~4)
- b) There is no torsional strain energy associated with ciprofloxacin
- c) Both chair conformations of the diamino-six-membered ring have the same energy
- d) The most acidic functional group will be ~100% ionized in the stomach.
- e) a & c

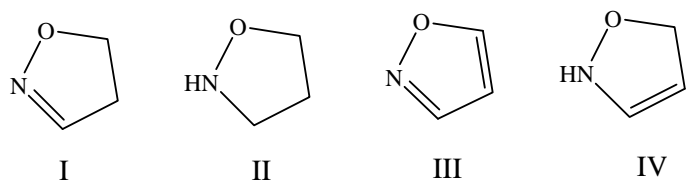
3. Unlike acetylcholine, only the most stable conformer about the C₂-C₃ bond of succinylcholine is pharmacologically active. Which of the following Newman projections represents the pharmacologically active conformer of succinylcholine chloride?

E



4. The order, from *most angle strain* to *least angle strain* for the compounds below is:

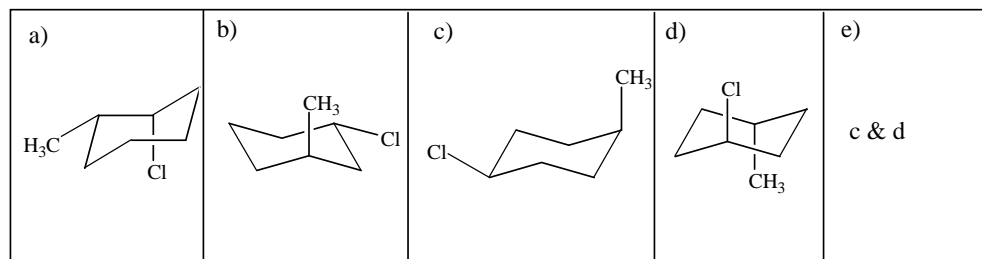
C



- | |
|----------------|
| a) I>II>III>IV |
| b) III>I>IV>II |
| c) III>I=IV>II |
| d) II>IV=I>III |
| e) IV>III>II>I |

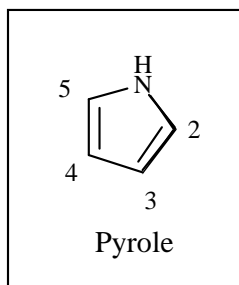
5. Which of the following structures corresponds to trans-1-chloro-4-methylcyclohexane?

D



6. Pyrole has a pKa of 12. The pKa of pyrole could be lowered the most by:

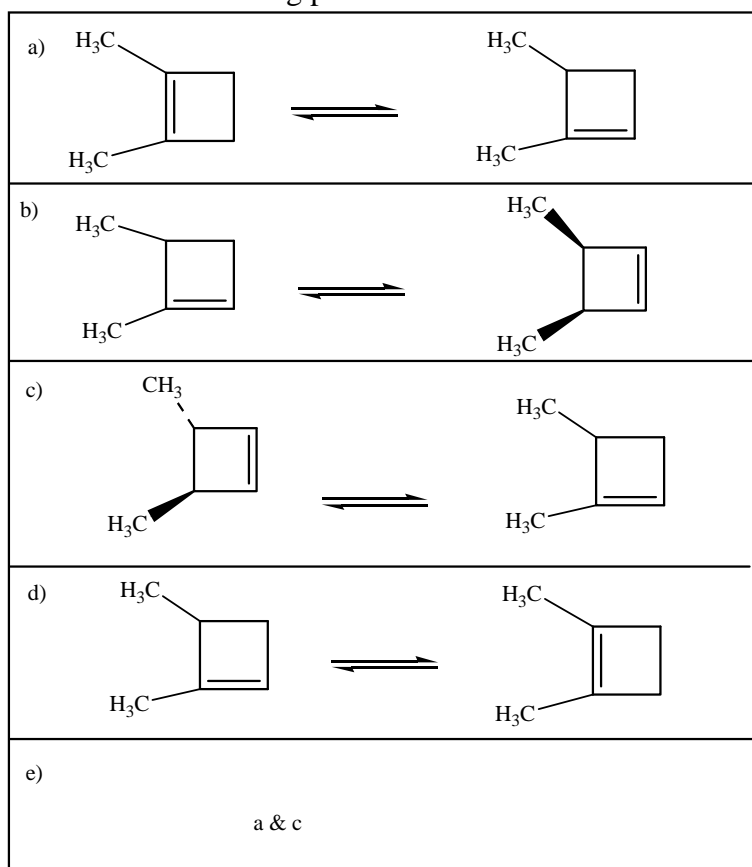
A



- a) a nitro group on the #3 carbon.
- b) a methyl group on the #3 carbon
- c) a hydroxy group on the # 2 carbon
- d) a methyl group on the #4 carbon
- e) none of these would influence the pKa

7. Which of the following processes are exothermic?

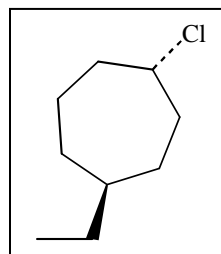
C
OR
D



8. The correct IUPAC name of the structure given is:

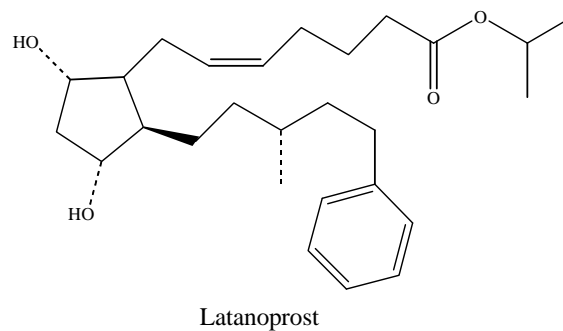
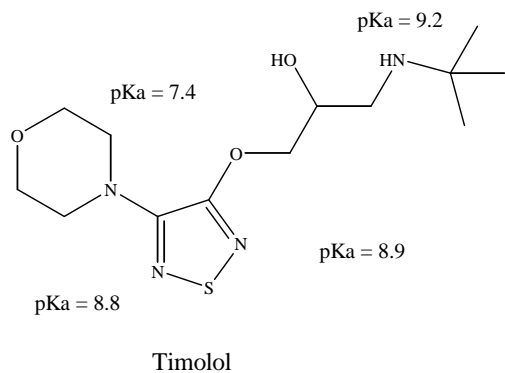
A

- a) trans-1-chloro-4-ethylcycloheptane
- b) trans-1-ethyl-4-chlorocycloheptane
- c) cis-1-chloro-4-ethylcycloheptane
- d) cis-1-methyl-4-chlorocyclooctane
- e) trans-1-chloro-3-ethylcycloheptane



9. Timolol and latanoprost are two agents used in the treatment of glaucoma, dispensed as eye drops. The pH of the eye is ~ 7.4 . Which of the following is true?

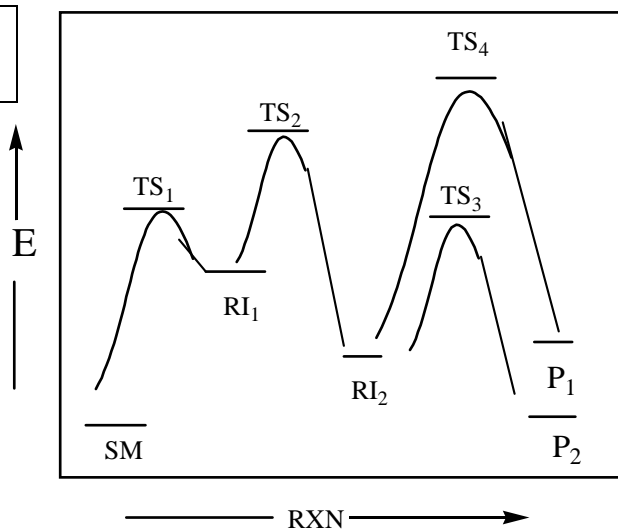
E



- Latanoprost is more readily absorbed than timolol.
- Timolol is more readily absorbed than latanoprost.
- Timolol is mostly ($>50\%$) ionized in the eye
- Latanoprost has two ionizable functional groups.
- a & c

10. Which of the following statements is true for the reaction energy diagram given below?

B

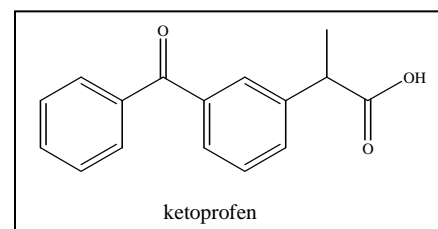


- Conversion of starting material to product 1 is exothermic.
- The free energy (ΔG°) of the conversion of starting material to product 2 is zero.
- Product 1 and 2 are derived from different reaction intermediates
- The reaction is a two-step reaction
- b & c

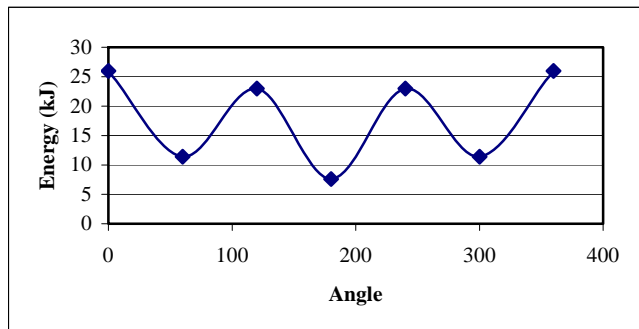
11. Which of the following statements is (are) true for ketoprofen?

E

- The K_a value is greater than 1 at a pH of 2.
- Ketoprofen is more soluble in lipids at a pH of 2 than at a pH of 9.
- The conjugate base is more water soluble than the acid.
- a & b
- b & c



12. Rotation around which bond of 2,3-dimethylbutane corresponds to the energy curve given below?

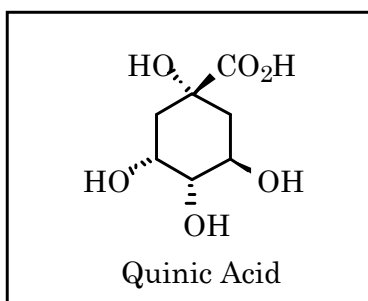


- a) C₁-C₂
- b) C₂-C₃
- c) C₃-C₄
- d) a & c
- e) none of these

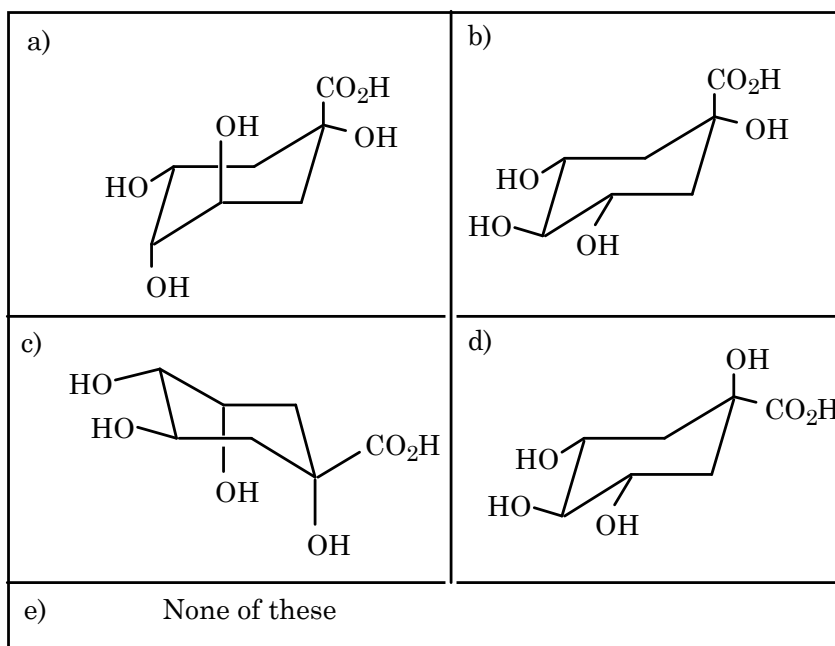
B

Torsional Strain Energy	kJ/mol	kcal/mol
H-H	4.0	1.0
H-Me	6.0	2.4
Me-Me	11	2.6
Steric Strain Energy		
Me-Me	3.8	0.9
Me-Ethyl	4.2	1.2

13. The most stable conformation of quinic acid is:

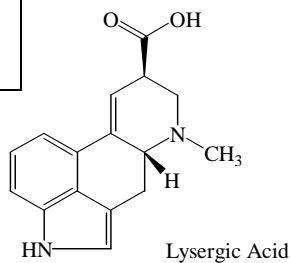


C



14. The percent ionization of the carboxylic acid of lysergic acid at pH = 8.1 is:

D

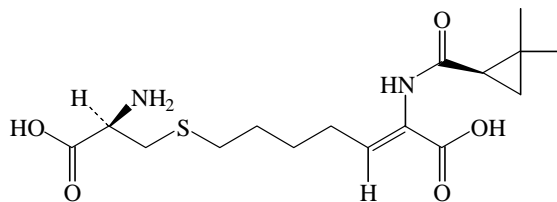


Functional Group	pKa
Carboxylic acid	6.6
Amine (weak)	8.1
Amine (strong)	9.9

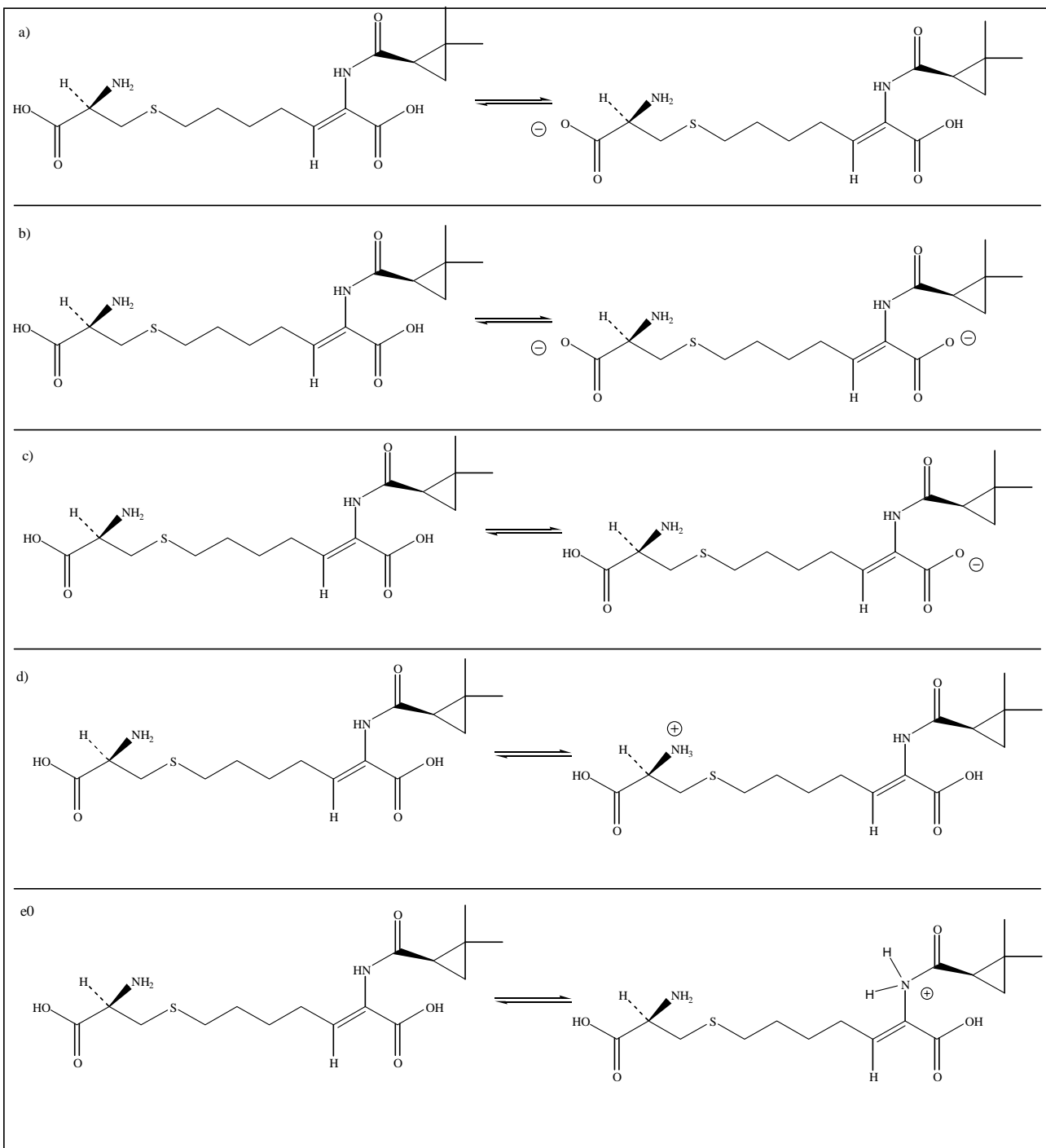
- a) 85%
- b) 3%
- c) 32%
- d) 97%
- e) 15%

15. The ionization scheme that most accurately describes what happens when cilastatin is exposed to urine (pH 5.6) is:

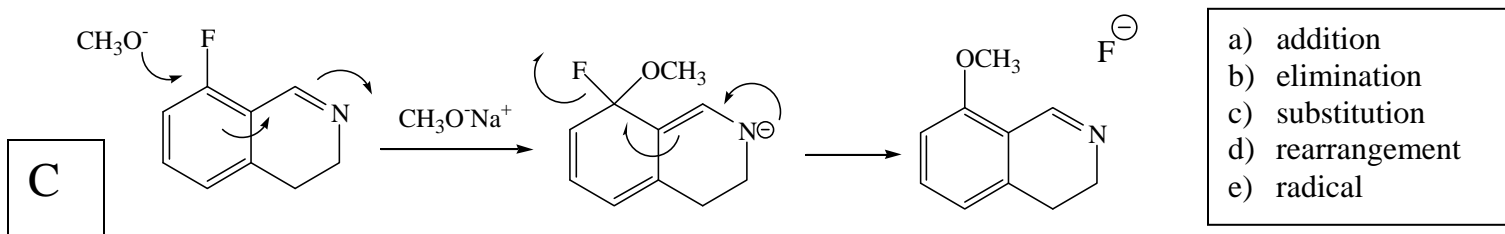
B OR D



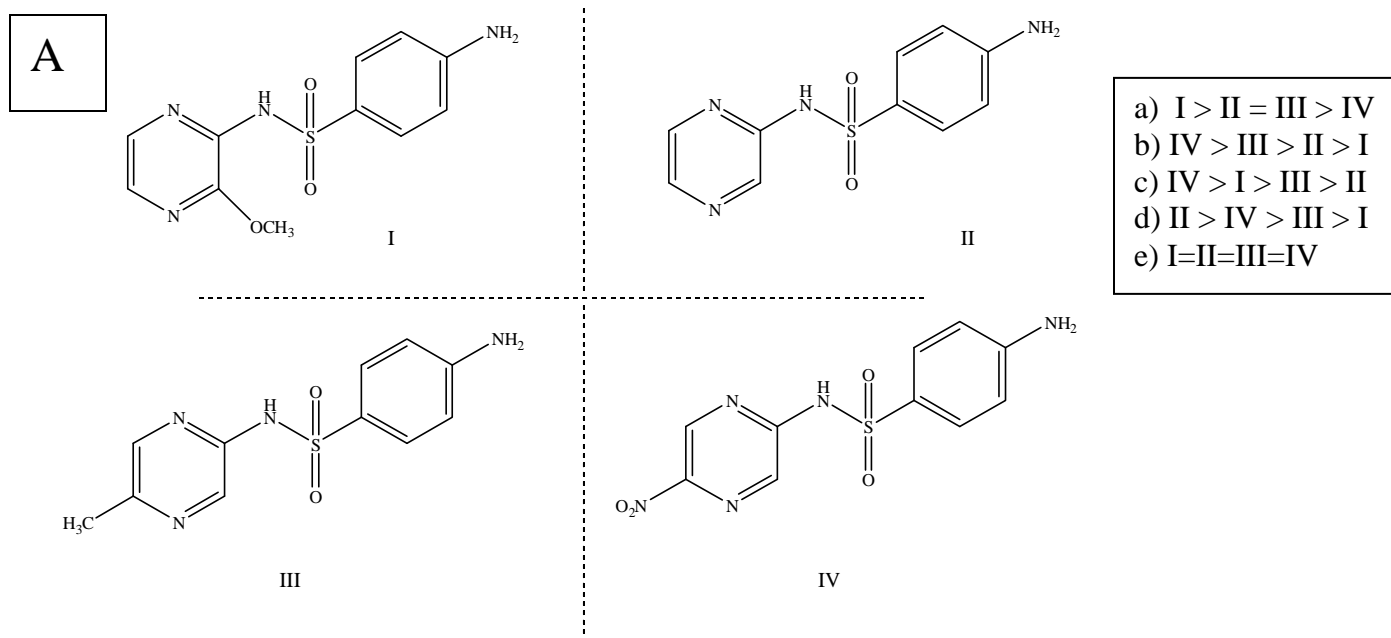
Cilastatin



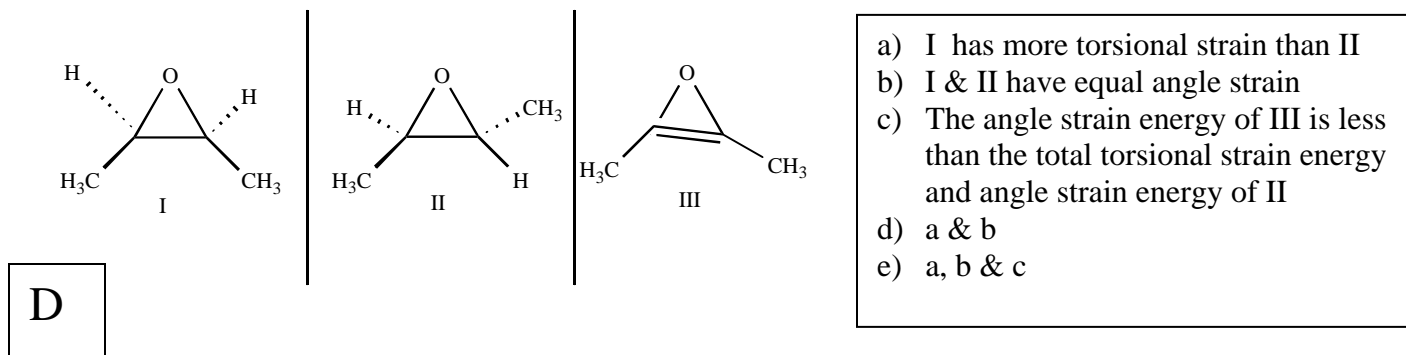
16. The reaction mechanism given below corresponds to which of the following reaction types?



17. The order of pKa values for the sulfonamide functional group from *highest pKa to lowest pKa* for the sulfa drugs given below is:



18. Epoxides are 3-membered rings containing one oxygen atom with torsional strain energies and angle strain energies similar to cyclopropanes. Compound 1 is less stable than compound II but compound II is more stable than compound III. Which of the following statements is true regarding compounds I, II and III?



19. In the *least stable* conformation of cis-1-chloro-2-methylcyclohexane:

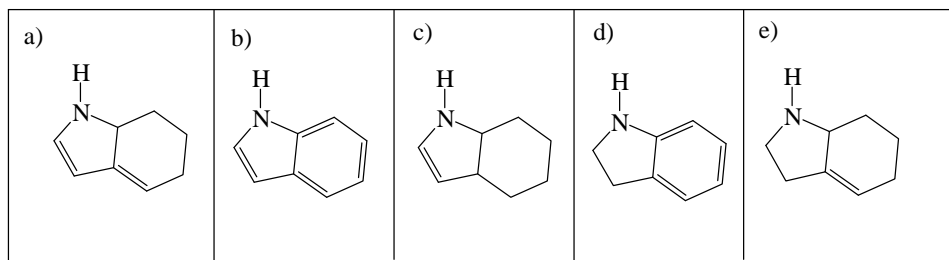
C

- a) both substituents are axial
- b) both substituents are equatorial
- c) the methyl is axial and the chloro is equatorial
- d) the chloro is axial and the methyl is equatorial

Steric Strain Energies	
H-Cl	0.75kcal
H-Me	1.0 kcal
Me-Me	2.4 kcal
Me-Cl	1.9 kcal

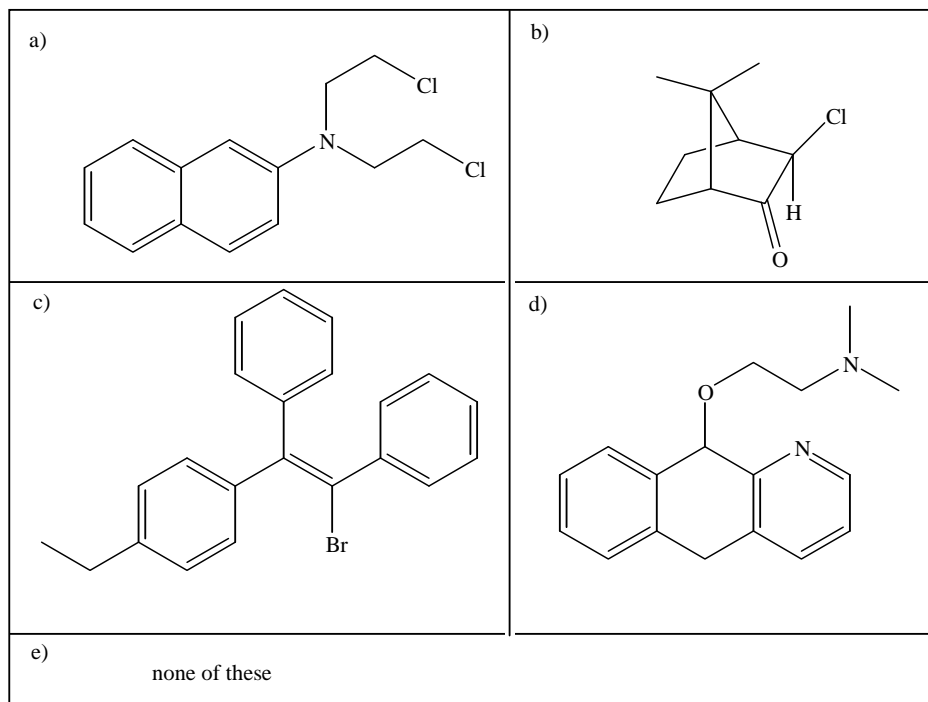
20. Which of the following compounds is the weakest base?

B



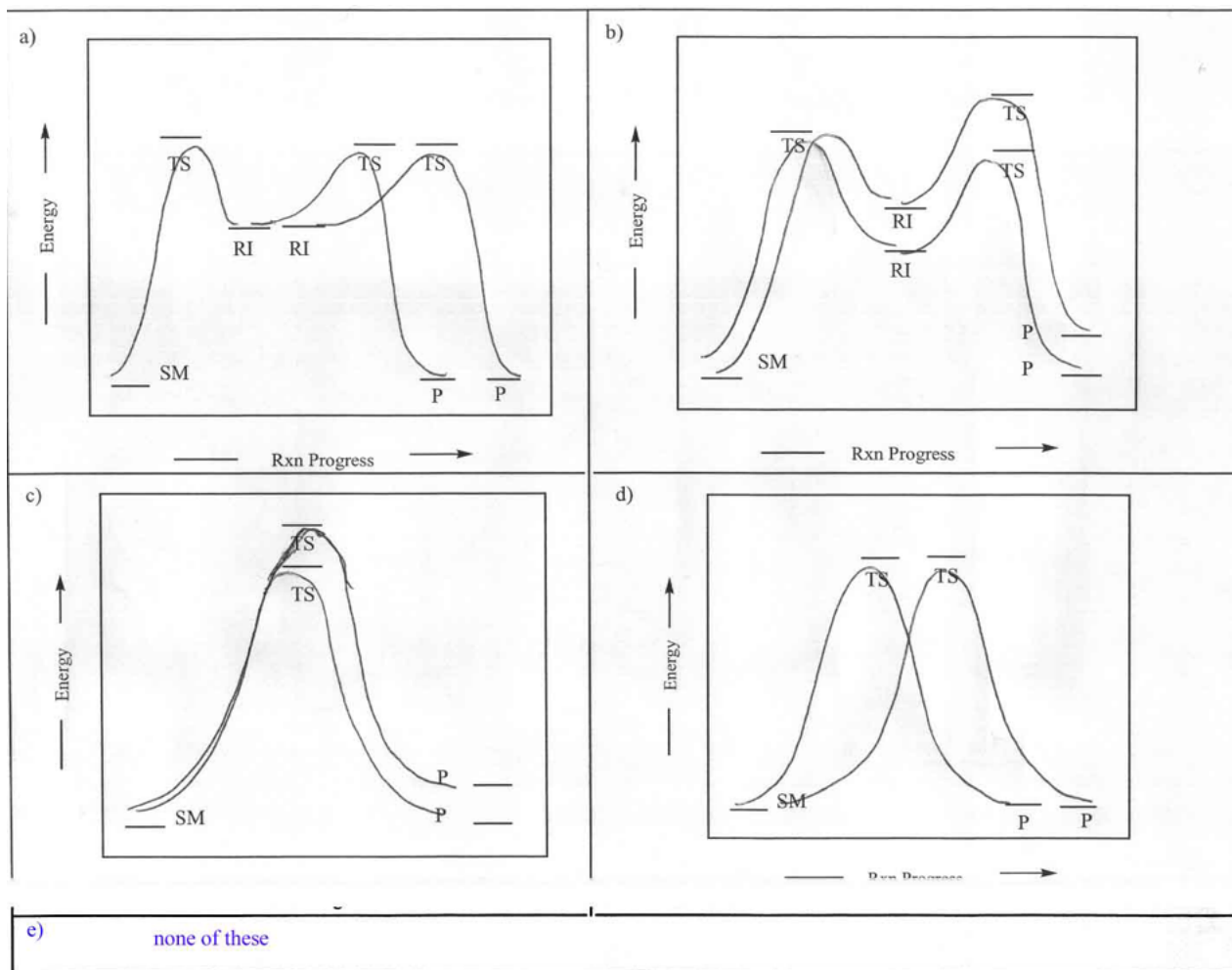
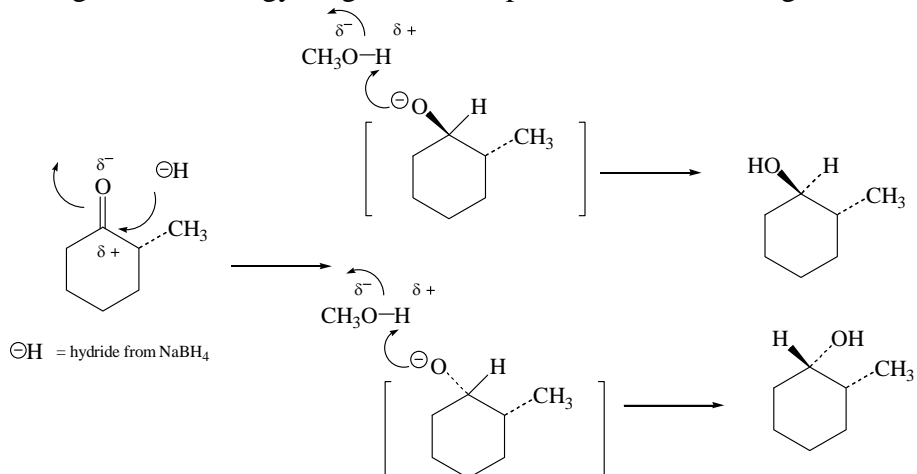
21. Which of the following compounds will give a positive test result (cloudy or precipitate) with AgNO_3 in ethanol?

B



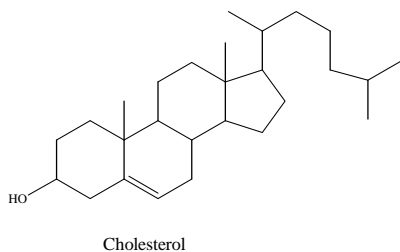
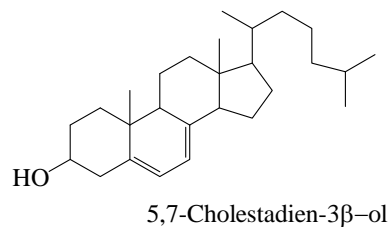
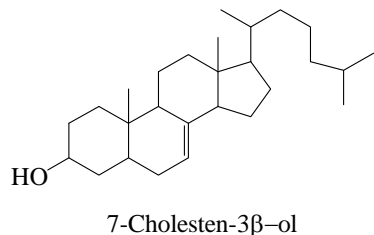
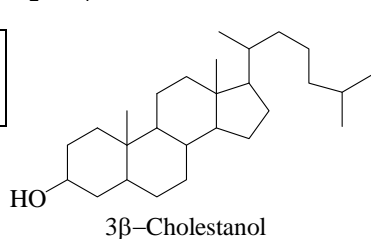
22. Which of the following reaction energy diagrams corresponds to the reaction given below?

B



23. Which of the structural analogs of cholesterol given below could be distinguished from cholesterol with the H_2SO_4 test?

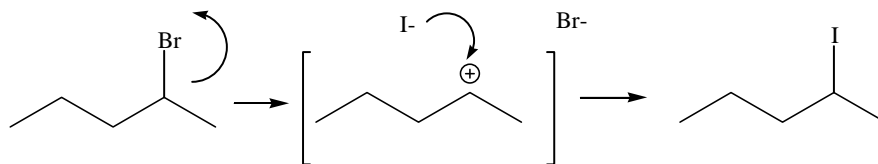
A



- a) 3β-cholestanol
 b) 7-cholesten-3β-ol
 c) 5,7-cholestadien-3β-ol
 d) b & c
 e) All of these structural analogs could be distinguished from cholesterol with the H_2SO_4 test

24. In the reaction below

B



- a) I is the leaving group, Br is the nucleophile and C^+ is the electrophile
 b) Br is the leaving group, I is the nucleophile and C^+ is the electrophile
 c) C^+ is the leaving group, I is the nucleophile, and Br is the electrophile
 d) Br is the leaving group, C^+ is the nucleophile and I is the electrophile
 e) C^+ is the leaving group, Br is the nucleophile and I is the electrophile

25. A resonance form of the conjugate base of meta-nitrobenzoic acid is:

D

