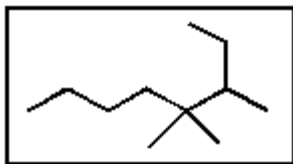


***Organic Chemistry Structure and Function 8th
edition Vollhardt Test Bank***

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Chapter 2

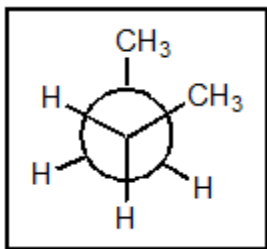
1. The correct name of the following molecule would be:



- a. 2-ethyl-3,3-dimethylheptane
- b. 6-ethyl-5,5-dimethylheptane
- c. 3,4,4-trimethyloctane
- d. 2-butyl-3-methylpentane
- e. 2-sec-butyl-2-methylhexane

ANSWER: c

2. What is the name given to the Newman projection of the butane conformation shown here?



- a. anti
- b. gauche
- c. staggered
- d. eclipsed
- e. skewed

ANSWER: b

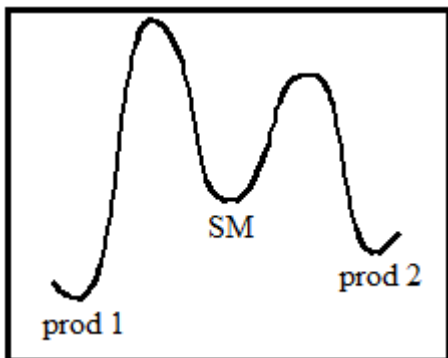
3. At room temperature, the various conformations of butane

- a. do not interconvert with only the *anti* form present.
- b. do not interconvert, but all forms are present.
- c. interconvert slowly.
- d. interconvert rapidly.
- e. There is no way to determine if interconversion occurs.

ANSWER: d

4. What statement is true of the following energy diagram?

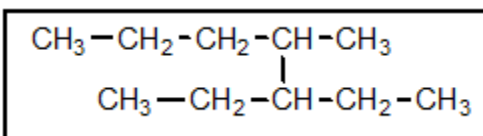
Chapter 2



- For irreversible reactions, product 1 will dominate.
- For reversible reactions, product 2 will dominate at equilibrium.
- For reversible reactions, equal amounts of 1 and 2 will be formed.
- For irreversible reactions, equal amounts of 1 and 2 will be formed.
- None of the above are true.

ANSWER: e

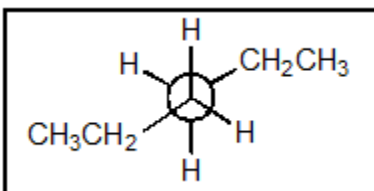
5. What would be the correct name of the following?



- 3-(sec-pentyl)pentane
- 5-ethyl-4-methylheptane
- 3-(sec-butyl)hexane
- 3-ethyl-4-methylheptane
- 3-ethyl-4-propylpentane

ANSWER: d

6. The following Newman projection corresponds to which molecule?

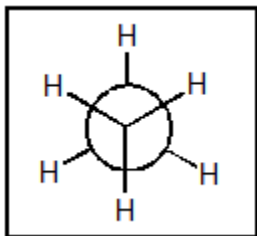


- pentane
- butane
- 3-ethylbutane
- hexane
- 3-methylpentane

ANSWER: d

Chapter 2

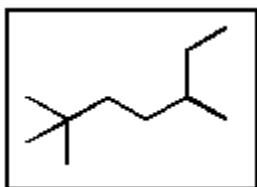
7. Rotation around the carbon-carbon bond of the molecule depicted by the following Newman projection requires how much energy?



- a. 0 kcal/mol
- b. 3 kcal/mol
- c. 6 kcal/mol
- d. 9 kcal/mol
- e. 15 kcal/mol

ANSWER: b

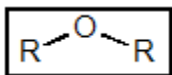
8. What is the correct IUPAC name for the following molecule?



- a. 1,1,1,4-tetramethylhexane
- b. 4-ethyl-1,1,1-trimethylpentane
- c. 5-ethyl-2,2-dimethylhexane
- d. 3,6,6,6-tetramethylhexane
- e. 2,2,5-trimethylheptane

ANSWER: e

9. The following represents what functional group?

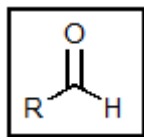


- a. ester
- b. ether
- c. alcohol
- d. thiol
- e. ketone

ANSWER: b

10. The following represents what functional group?

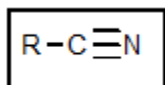
Chapter 2



- a. alcohol
- b. aldehyde
- c. carboxylic acid
- d. amide
- e. ketone

ANSWER: b

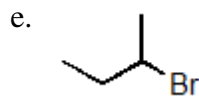
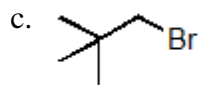
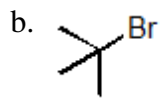
11. The following represents what functional group?



- a. amide
- b. thiol
- c. ketone
- d. nitrile
- e. amine

ANSWER: d

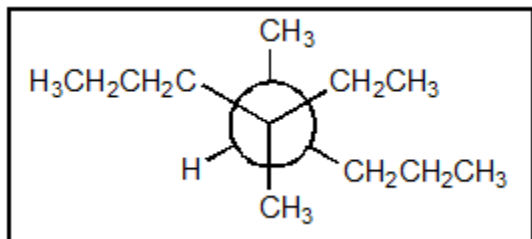
12. What is the correct structure for *tert*-butyl bromide?



ANSWER: b

13. The following Newman projection represents which molecule?

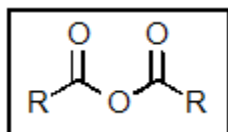
Chapter 2



- a.
- b.
- c.
- d.
- e.

ANSWER: a

14. Name the following functional group:

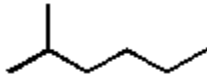
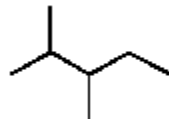
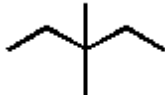
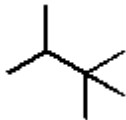
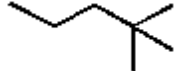


- a. ester
- b. ketone
- c. alcohol
- d. carboxylic acid
- e. anhydride

ANSWER: e

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15. Which isomer of C_7H_{16} shown would have the highest boiling point?

- a. 
- b. 
- c. 
- d. 
- e. 

ANSWER: a

16. Which of the following contains the isobutyl group?

- a. $(CH_3)_2CHCH_2Cl$
- b. $(CH_3)_3CCl$
- c. $CH_3CH_2CH(CH_3)Cl$
- d. $CH_3CH_2CH_2CH_2Cl$
- e. None of the above.

ANSWER: a

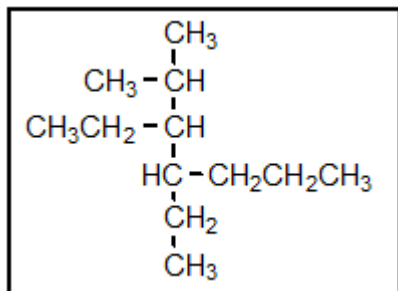
17. Which of the following contains the *sec*-butyl group?

- a. $(CH_3)_2CHCH_2Cl$
- b. $(CH_3)_3CCl$
- c. $CH_3CH_2CH(CH_3)Cl$
- d. $CH_3CH_2CH_2CH_2Cl$
- e. None of the above.

ANSWER: c

18. How would the following molecule be properly named?

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- 3-ethyl-2-methyl-4-propylhexane
- 3,4-diethyl-2-methylheptane
- 4-ethyl-3-isopropylheptane
- 3-isopropyl-4-propylhexane
- None of the above.

ANSWER: b

19. The IUPAC name for $[(\text{CH}_3)_3\text{C}]_2\text{CHCH}_3$ is:

- 1,1-di-*tert*-butylethane
- 3-*tert*-butyl-2,2-dimethylbutane
- 2,2,3,4,4-pentamethylpentane
- 2,4,4-trimethylheptane
- None of the above.

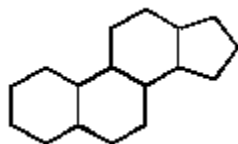
ANSWER: c

20. What is the smallest alkane that is liquid at room temperature?

- propane
- butane
- pentane
- hexane
- All are liquids.

ANSWER: c

21. All steroids are derivatives of the ring system shown. How many **tertiary hydrogens** are in this ring system?



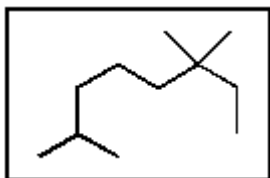
- none
- 2
- 4
- 5

Chapter 2

e. 6

ANSWER: e

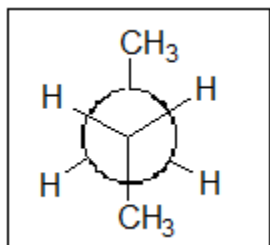
22. What is the correct IUPAC name for the following molecule:



- a. 2-ethyl-2,6-dimethylheptane
- b. 1,1,5,5-tetramethylhexane
- c. 1,1,5,5-tetramethylheptane
- d. 2,6,6-trimethyloctane
- e. 4,4-dimethyl-1-isopropylhexane

ANSWER: d

23. What is the name given to the Newman projection of the butane conformation shown here?



- a. eclipsed
- b. gauche
- c. staggered
- d. anti
- e. skewed

ANSWER: d

24. Calculate ΔG° for the following reaction at 25 °C and $\Delta S=0$ 

Bond	Ave Strength
C-C	83 (kcal/mol)
C-H	99 (kcal/mol)
C-Br	68 (kcal/mol)
H-Br	87 (kcal/mol)
Br-Br	46 (kcal/mol)

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- a. -10 kcal/mol
- b. 10 kcal/mol
- c. 34 kcal/mol
- d. -34 kcal/mol
- e. None of the above.

ANSWER: a

25. Which of the following has the highest pK_a ?

- a. HI
- b. NH_3
- c. HNO_3
- d. CH_3COOH
- e. H_2SO_4

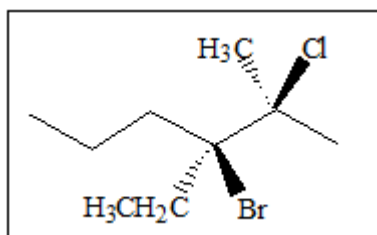
ANSWER: b

26. The common name for 1-methylpropyl is:

- a. Isopropyl
- b. Isobutyl
- c. *sec*-Butyl
- d. *tert*-Butyl
- e. None of the above.

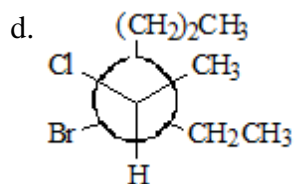
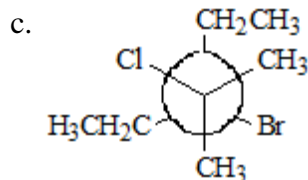
ANSWER: c

27. What is the correct Newman projection for the following molecule?



- a.
- b.

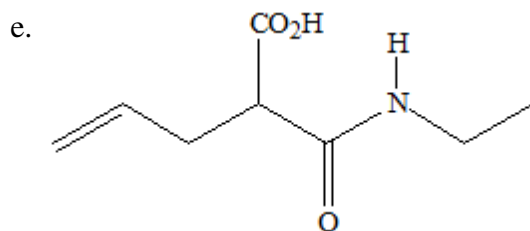
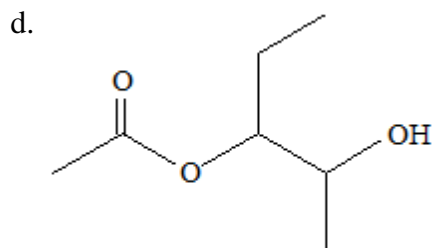
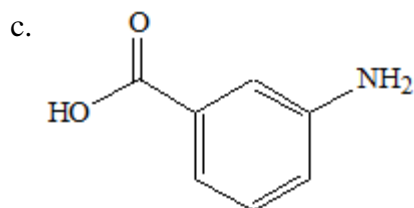
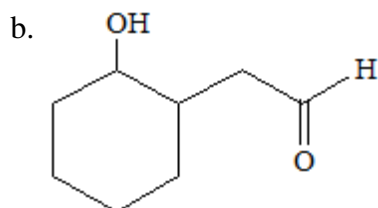
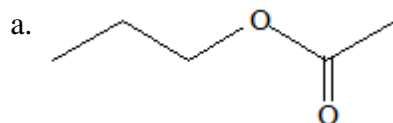
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e. None of the above.

ANSWER: a

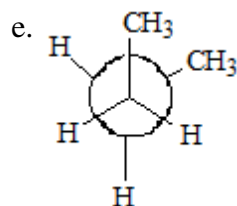
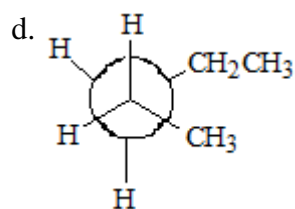
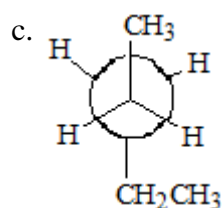
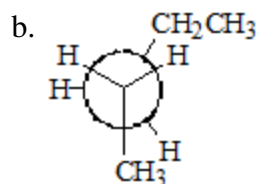
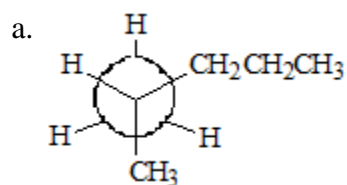
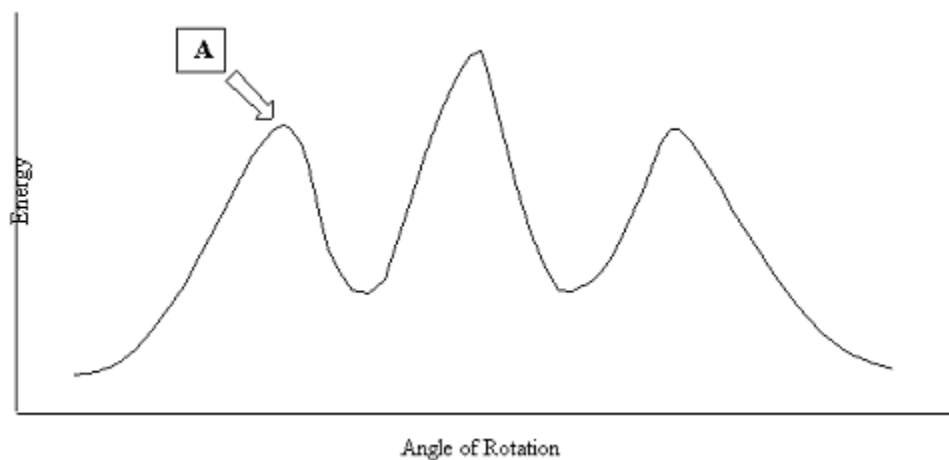
28. Which of the following molecules contain both an alcohol and an aldehyde functional group?



ANSWER: b

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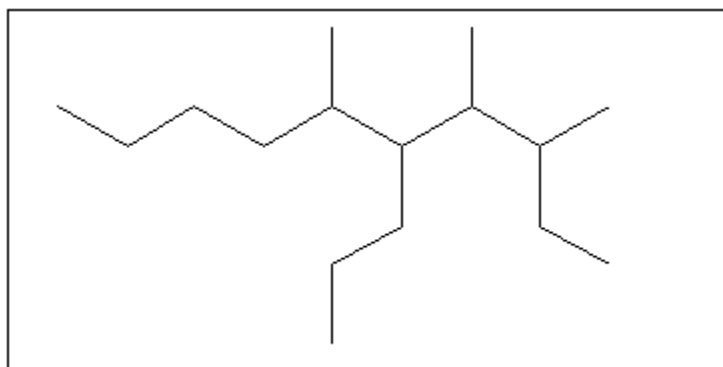
29. Consider the potential energy diagram for rotation about the C2–C3 bond in pentane. The position marked "A" most likely corresponds to which of the following Newman projections?



ANSWER: b

30. What is the correct IUPAC name for the following molecule?

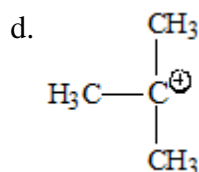
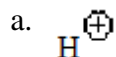
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- a. 6-propyl-5,7,8-trimethyldecane
- b. 5,7,8-trimethyl-6-propyldecane
- c. 3,4,6-trimethyl-5-propyldecane
- d. 5-propyl-3,4,6-trimethyldecane
- e. None of the above.

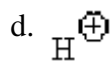
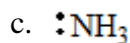
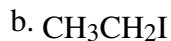
ANSWER: c

31. Which of the following is not considered a Lewis acid?



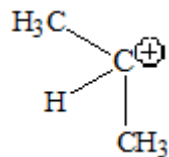
ANSWER: b

32. Which of the following is considered to be a nucleophile?



e.

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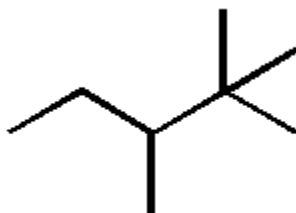
ANSWER: c

33. Which of the following reactions has a $\Delta S = 0$?

- a.
- b. $\text{CH}_3\text{CH}_2\text{Cl} + \text{NaOH} \rightarrow \text{CH}_2=\text{CH}_2 + \text{H}_2\text{O} + \text{NaCl}$
- c.
- d.
- e. None of the above.

ANSWER: c

34. How many quaternary carbons are in the following molecule?

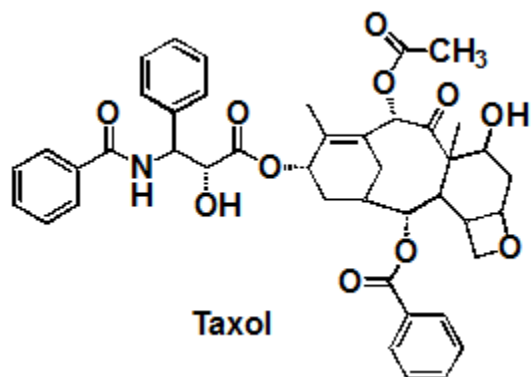


- a. 0
- b. 1
- c. 2
- d. 3
- e. 4

ANSWER: b

35. How many ester functional groups are in the potent anticancer compound Taxol?

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- a. 0
- b. 1
- c. 2
- d. 3
- e. 4

ANSWER: d

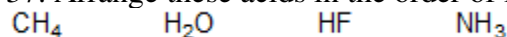
36. Arrange these acids in the order of increasing acidity.



- a. HBr, HI, HF, HCl
- b. HF, HCl, HBr, HI
- c. HF, HBr, HCl, HI
- d. HI, HCl, HBr, HF
- e. HI, HBr, HCl, HF

ANSWER: b

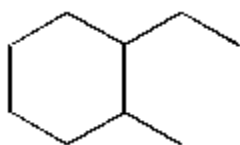
37. Arrange these acids in the order of increasing acidity.



- a. CH₄, H₂O, HF, NH₃
- b. HF, H₂O, CH₄, NH₃
- c. HF, H₂O, NH₃, CH₄,
- d. CH₄, NH₃, H₂O, HF,
- e. NH₃, CH₄, H₂O, HF,

ANSWER: d

38. What is the correct IUPAC name for the following molecule?



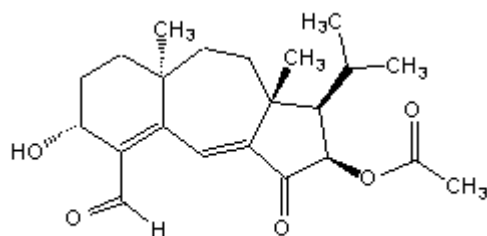
- a. 1-ethyl-2-methylhexane
- b. 2-ethyl-1-methylcycloheptane

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- c. 4-ethyl-5-methylcyclohexane
- d. 1-ethyl-2-methylcyclohexane
- e. 1-methyloctane

ANSWER: d

39. Guanacastepene is a natural product that was recently isolated and shown to be a potent antibiotic. How many **different** functional groups does this structure possess?



Guanacastepene

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

ANSWER: e