

## Chapter 02 - Alkanes and Cycloalkanes

1. Approximately how long is a C–C single bond of an alkane?

- a. 111 pm
- b. 134 pm
- c. 142 pm
- d. 153 pm

ANSWER: d

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

2. What is the approximate C–C–C bond angle in propane?

- a. 90°
- b. 109°
- c. 120°
- d. 180°

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

3. What is the name of the linear hydrocarbon with the molecular formula C<sub>7</sub>H<sub>16</sub>?

- a. hexane
- b. heptane
- c. decane
- d. undecane

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

4. What is the name of the linear hydrocarbon with the molecular formula C<sub>11</sub>H<sub>24</sub>?

- a. heptane
- b. decane
- c. undecane
- d. eicosane

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

## Chapter 02 - Alkanes and Cycloalkanes

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

5. How many hydrogen atoms are there in nonane, the linear hydrocarbon with nine carbon atoms?

- a. 16
- b. 18
- c. 20
- d. 22

*ANSWER:* c

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

6. How many hydrogen atoms are there in dodecane, the linear hydrocarbon with twelve carbon atoms?

- a. 12
- b. 20
- c. 24
- d. 26

*ANSWER:* d

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

7. How many constitutional isomers are there with the molecular formula  $C_4H_{10}$ ?

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

*ANSWER:* a

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

8. How many constitutional isomers are there with the molecular formula  $C_5H_{12}$ ?

- a. 2
- b. 3
- c. 4

## Chapter 02 - Alkanes and Cycloalkanes

d. 5

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

9. How many constitutional isomers are there with the molecular formula  $C_6H_{14}$ ?

a. 3

b. 4

c. 5

d. 8

ANSWER: c

POINTS: 1

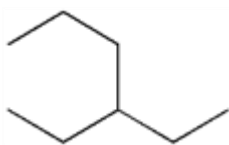
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

10. What is the IUPAC name of the following compound?



a. 3-propylpentane

b. 1,1-diethylpropane

c. 3-ethylhexane

d. isooctane

ANSWER: c

POINTS: 1

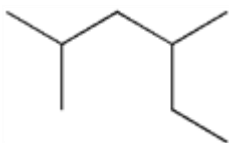
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

11. What is the IUPAC name of the following compound?



a. 2-ethyl-4-methylpentane

b. 2,4-dimethylhexane

## Chapter 02 - Alkanes and Cycloalkanes

- c. 3,5-dimethylhexane
- d. 1,1,3-trimethylpentane

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

12. What is the IUPAC name of the following compound?



- a. 2,2-dimethyl-4-ethylheptane
- b. 4-ethyl-2,2-dimethyl-heptane
- c. 6,6-dimethyl-4-ethylheptane
- d. 4-ethyl-6,6-dimethyl-heptane

ANSWER: b

POINTS: 1

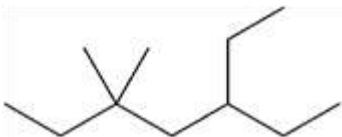
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

13. What is the IUPAC name of the following compound?



- a. 5,5-dimethyl-3-ethylheptane
- b. 5-ethyl-3,3-dimethyl-heptane
- c. 3,3-dimethyl-5-ethylheptane
- d. 3-ethyl-5,5-dimethyl-heptane

ANSWER: d

POINTS: 1

QUESTION TYPE: Multiple Choice

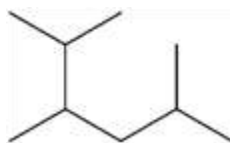
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

14. What is the IUPAC name of the following compound?

## Chapter 02 - Alkanes and Cycloalkanes



- a. 2-isopropyl-5-methylpentane
- b. 5-isopropyl-2-methylpentane
- c. 2,3,5-trimethylhexane
- d. 1,2-diisopropylpropane

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

15. What is the IUPAC name of the following compound?



- a. 2,4-dimethyl-3-isopropyl-pentane
- b. 3-isopropyl-1,5-dimethylpentane
- c. 3-isopropyl-2,4-dimethylpentane
- d. triisopropylmethane

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

16. Which of the following compounds has 1°, 2°, 3° and 4° carbon atoms?

- a. hexane
- b. 2-methylhexane
- c. 2,2-dimethylhexane
- d. 2,2,3-trimethylhexane

ANSWER: d

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

## Chapter 02 - Alkanes and Cycloalkanes

17. Which of the following compounds has only 1° and 3° carbon atoms?

- a. hexane
- b. 2-methylpentane
- c. 3-methylpentane
- d. 2,3-dimethylbutane

ANSWER: d

POINTS: 1

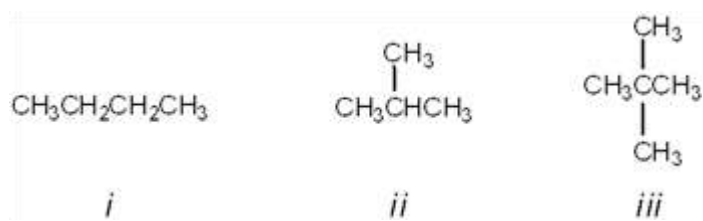
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

18. What is the correct assignment of common names for the following molecules?



- a. *i* = butane; *ii* = neopentane; *iii* = isopentane
- b. *i* = neobutane; *ii* = isobutane; *iii* = pentane
- c. *i* = butane; *ii* = isobutane; *iii* = isopentane
- d. *i* = butane; *ii* = isobutane; *iii* = neopentane

ANSWER: d

POINTS: 1

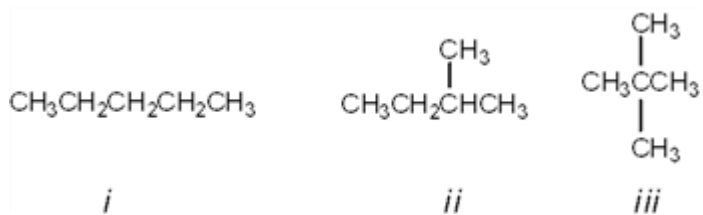
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

19. What is the correct assignment of common names for the following molecules?



- a. *i* = pentane; *ii* = isopentane; *iii* = neopentane
- b. *i* = neopentane; *ii* = isopentane; *iii* = pentane
- c. *i* = pentane; *ii* = neopentane; *iii* = isopentane
- d. *i* = neopentane; *ii* = pentane; *iii* = isopentane

ANSWER: a

POINTS: 1

QUESTION TYPE: Multiple Choice

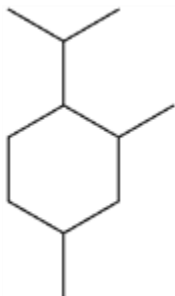
## Chapter 02 - Alkanes and Cycloalkanes

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

20. What is the IUPAC name of the following compound?



- a. 1-isopropyl-4,6-dimethylcyclohexane
- b. 1-isopropyl-2,4-dimethylcyclohexane
- c. 4-isopropyl-1,3-dimethylcyclohexane
- d. 4-isopropyl-1,5-dimethylcyclohexane

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

21. What is the IUPAC name of the following compound?



- a. 1-methylbicyclo[2.2.1]heptane
- b. 2-methylbicyclo[2.2.1]heptane
- c. 3-methylbicyclo[2.2.1]heptane
- d. 4-methylbicyclo[2.2.1]heptane

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

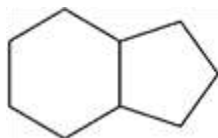
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

22. What is the IUPAC name of the following compound?

## Chapter 02 - Alkanes and Cycloalkanes



- a. bicyclo[4.3]nonane
- b. bicyclo[4.3.0]nonane
- c. bicyclo[6.5]nonane
- d. bicyclo[6.5.0]nonane

ANSWER: b

POINTS: 1

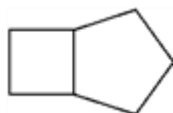
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

23. What is the IUPAC name for the following compound?



- a. cycloheptane
- b. bicyclo[3.2.0]heptane
- c. bicyclo[5.4]heptane
- d. cyclobutylcyclopentane

ANSWER: b

POINTS: 1

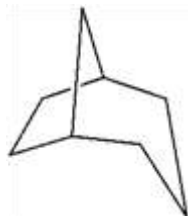
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

24. What is the IUPAC name for the following compound?



- a. bicyclo[5.4.3]octane
- b. bicyclo[3.2.1]octane
- c. bicyclo[3.2.1]hexane
- d. bicyclo[2.2.1]octane

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice



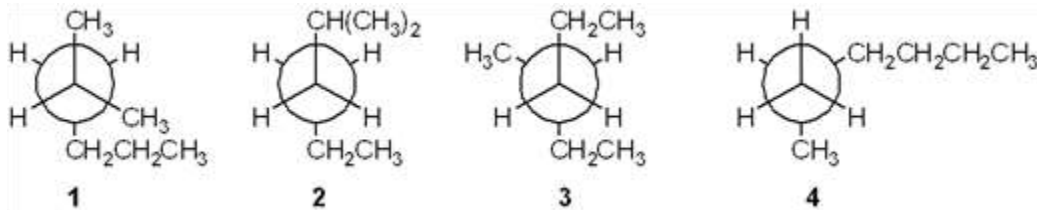
## Chapter 02 - Alkanes and Cycloalkanes

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

25. Which of the following Newman projections does *not* represent 2-methylhexane?



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

ANSWER: c

POINTS: 1

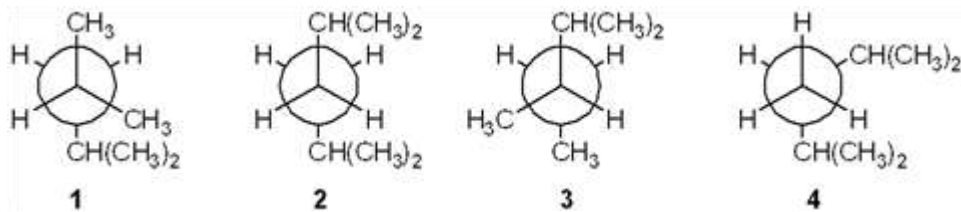
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

26. Which of the following Newman projections represents 2,4-dimethylpentane?



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

ANSWER: a

POINTS: 1

QUESTION TYPE: Multiple Choice

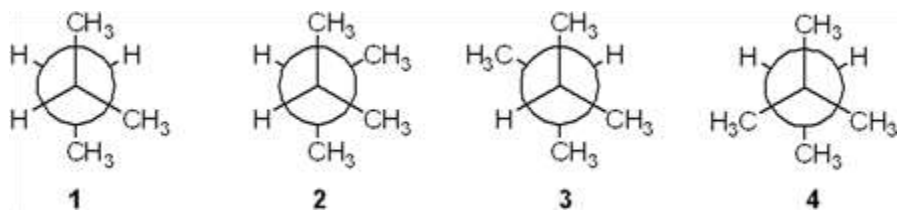
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

27. Which of the following Newman projections represents the most stable conformation of 2,3-dimethylbutane?

## Chapter 02 - Alkanes and Cycloalkanes



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

ANSWER: c

POINTS: 1

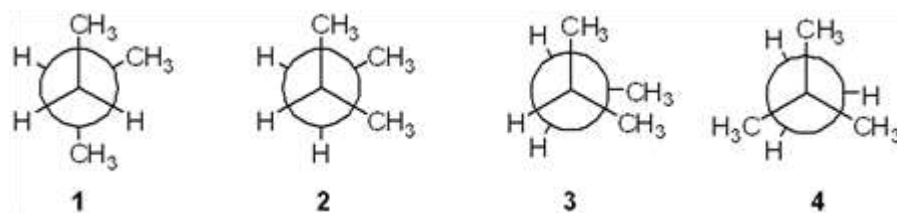
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

28. Which of the following Newman projections represents the most stable conformation of 2-methylbutane?



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

ANSWER: a

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

29. Which of the following cycloalkanes has the most ring strain?

- a. cyclopropane
- b. cyclobutane
- c. cyclopentane
- d. cyclohexane

ANSWER: a

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

## Chapter 02 - Alkanes and Cycloalkanes

DATE MODIFIED: 3/12/2015 3:24 PM

30. Which of the following cycloalkanes has the least ring strain?

- a. cyclopropane
- b. cyclopentane
- c. cyclohexane
- d. cycloheptane

ANSWER: c

POINTS: 1

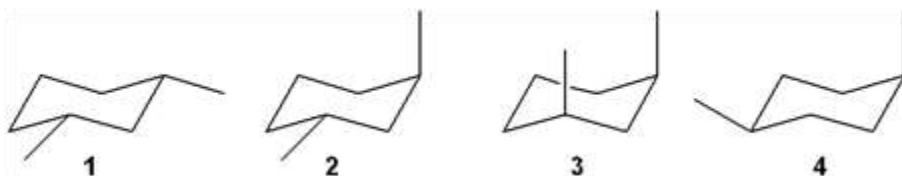
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

31. Which of the following structures represents *trans*-1,3-dimethylcyclohexane?



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

ANSWER: b

POINTS: 1

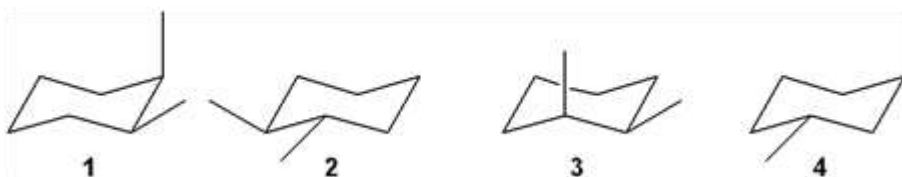
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

32. Which of the following structures represents *trans*-1,2-dimethylcyclohexane?



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

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

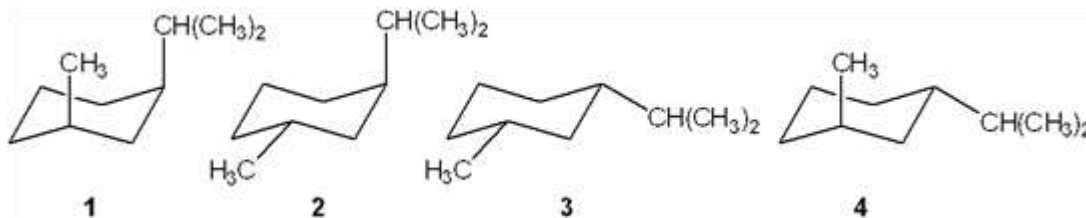
## Chapter 02 - Alkanes and Cycloalkanes

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

33. Which of the following is the most stable conformation of *cis*-1-isopropyl-3-methylcyclohexane?



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

ANSWER: c

POINTS: 1

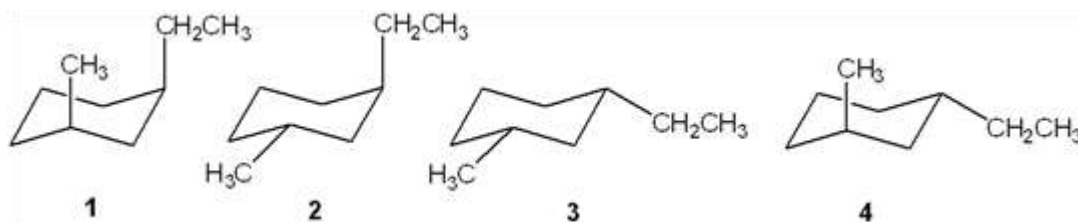
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

34. Which of the following is the most stable conformation of *trans*-1-ethyl-3-methylcyclohexane?



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

ANSWER: d

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

35. Which of the following alkanes has the highest boiling point?

- a. propane  
b. butane  
c. pentane

## Chapter 02 - Alkanes and Cycloalkanes

d. hexane

ANSWER: d

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

36. Which of the following alkanes has the highest boiling point?

a. 2,3-dimethylbutane

b. 2-methylpentane

c. 3-methylpentane

d. hexane

ANSWER: d

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

37. What is the IUPAC name of the following compound?



a. *trans*-1-isopropyl-4-methylcyclohexane

b. *cis*-1-isopropyl-4-methylcyclohexane

c. *cis*-2-isopropyl-5-methylcyclohexane

d. *cis*-1-*tert*-butyl-4-methylcyclohexane

ANSWER: b

POINTS: 1

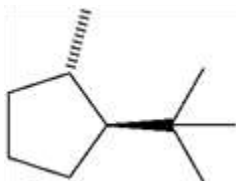
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

38. What is the IUPAC name of the following compound?



a. *trans*-1-isopropyl-4-methylcyclopentane

b. *cis*-1-*tert*-butyl-2-methylcyclopentane

## Chapter 02 - Alkanes and Cycloalkanes

c. *trans*-1-*tert*-butyl-2-methylcyclopentane

d. *cis*-1-isopropyl-2-methylcyclopentane

ANSWER: c

POINTS: 1

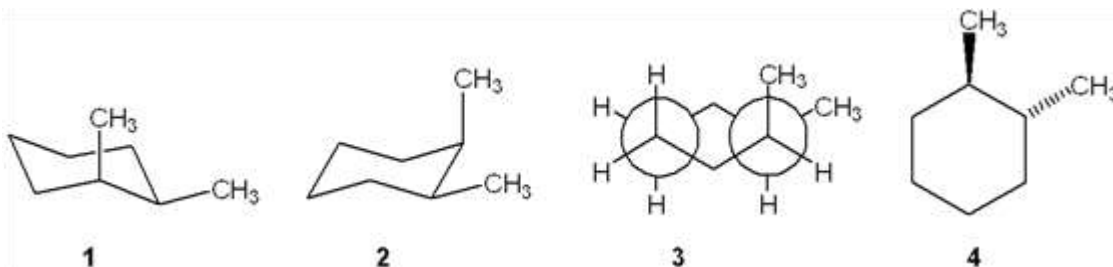
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

39. Which one of the following structures represents a different compound from the other three?



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

ANSWER: d

POINTS: 1

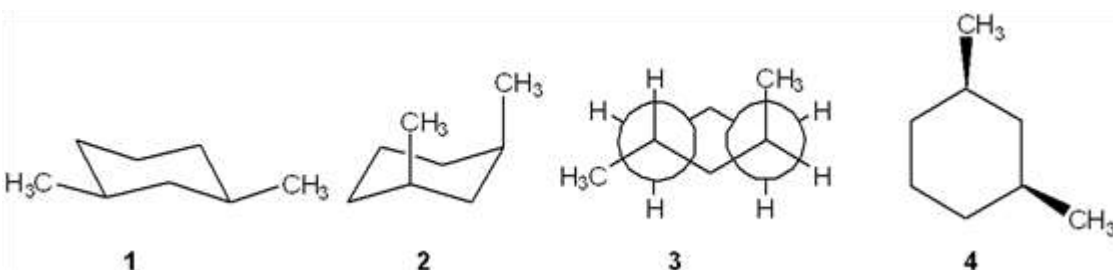
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

40. Which one of the following structures represents a different compound from the other three?



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

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

## Chapter 02 - Alkanes and Cycloalkanes

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

41. In which of the following compounds are all of the carbon atoms in the same plane?

- a. cyclopropane
- b. cyclobutane
- c. cyclopentane
- d. cyclohexane

ANSWER: a

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

42. Which of the following compounds can adopt a chair conformation in which there are no axial methyl groups?

- a. 1,1-dimethylcyclohexane
- b. *cis*-1,2-dimethylcyclohexane
- c. *trans*-1,2-dimethylcyclohexane
- d. *cis*-1,3-dimethylcyclohexane

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

43. Which of the following compounds can adopt a chair conformation in which there are no axial methyl groups?

- a. *cis*-1,2-dimethylcyclohexane
- b. *cis*-1,3-dimethylcyclohexane
- c. *trans*-1,3-dimethylcyclohexane
- d. *cis*-1,4-dimethylcyclohexane

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

44. Which of the following statements is not true regarding the conformation of substituted cyclohexanes?

- a. ring inversion of cyclohexane between two chair conformations takes place via a boat conformation
- b. substituted cyclohexanes are destabilized by 1,3-diaxial interactions
- c. the boat conformation of cyclohexane is usually more stable than the chair conformation

## Chapter 02 - Alkanes and Cycloalkanes

d. the relative amount of two conformations of substituted cyclohexanes can be determined from the difference in strain energy

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

45. What is the approximate dihedral angle between the two chlorine atoms in *cis*-1,2-dichlorocyclohexane?

- a. 0°
- b. 60°
- c. 120°
- d. 180°

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

46. What is the approximate dihedral angle between the two chlorine atoms in the diequatorial conformation of *trans*-1,2-dichlorocyclohexane?

- a. 0°
- b. 60°
- c. 120°
- d. 180°

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

47. What is the approximate dihedral angle between the two chlorine atoms in the diaxial conformation of *trans*-1,2-dichlorocyclohexane?

- a. 0°
- b. 60°
- c. 120°
- d. 180°

ANSWER: d

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False



## Chapter 02 - Alkanes and Cycloalkanes

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

48. Which of the following is *not* true regarding the properties of alkanes?

- a. alkanes are nonpolar
- b. alkanes burn in air to give H<sub>2</sub>O and CO<sub>2</sub>
- c. alkanes are highly miscible with water
- d. the strongest intermolecular force between alkane molecules is the van der Waals interaction

*ANSWER:* c

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

49. Which of the following undergoes the most exothermic combustion?

- a. octane
- b. 2-methylheptane
- c. 2,2-dimethylhexane
- d. 2,2,3,3-tetramethylbutane

*ANSWER:* a

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

50. How many moles of molecular oxygen (O<sub>2</sub>) are consumed in the complete combustion of one mole of octane (C<sub>8</sub>H<sub>18</sub>)?

- a. 12.5
- b. 13
- c. 17
- d. 26

*ANSWER:* a

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

51. How many moles of molecular oxygen (O<sub>2</sub>) are consumed in the complete combustion of one mole of hexane (C<sub>6</sub>H<sub>14</sub>)?

- a. 6
- b. 9.5

## Chapter 02 - Alkanes and Cycloalkanes

c. 12.5

d. 14

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

52. Which of the following statements is *not* true?

a. Combustion of an alkane is an exothermic reaction.

b. The heat of combustion of propane is three times that of methane.

c. The constitutional isomers of  $C_7H_{16}$  have different heats of combustion from one another

d. The products of combustion of an alkane are  $H_2O$  and  $CO_2$ .

ANSWER: b

POINTS: 1

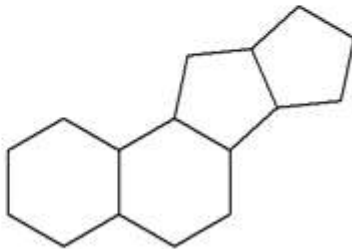
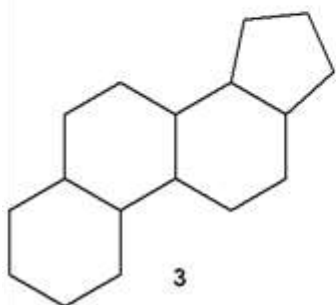
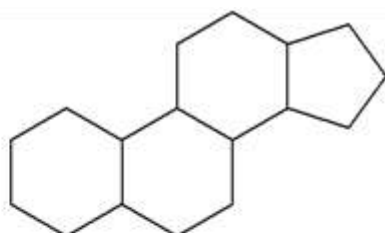
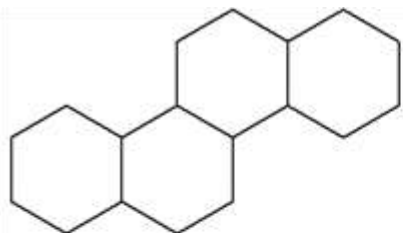
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

53. Which of the following is the steroid nucleus?



a. 1

b. 2

c. 3

d. 4

ANSWER: b

POINTS: 1

## Chapter 02 - Alkanes and Cycloalkanes

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

54. Which of the following cycloalkanes has the largest heat of combustion?

- a. cyclopropane
- b. cyclobutane
- c. cyclopentane
- d. cyclohexane

*ANSWER:* d

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

55. Which of the following cycloalkanes has the largest heat of combustion per carbon atom?

- a. cyclopropane
- b. cyclopentane
- c. cyclohexane
- d. cycloheptane

*ANSWER:* a

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

56. Which of the following cycloalkanes has the smallest heat of combustion per carbon atom?

- a. cyclopropane
- b. cyclopentane
- c. cyclohexane
- d. cycloheptane

*ANSWER:* c

*POINTS:* 1

*QUESTION TYPE:* Multiple Choice

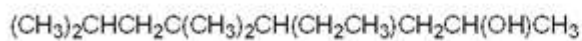
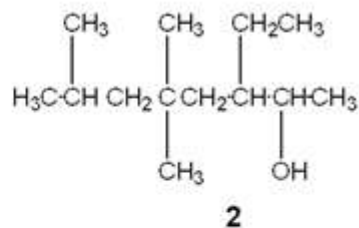
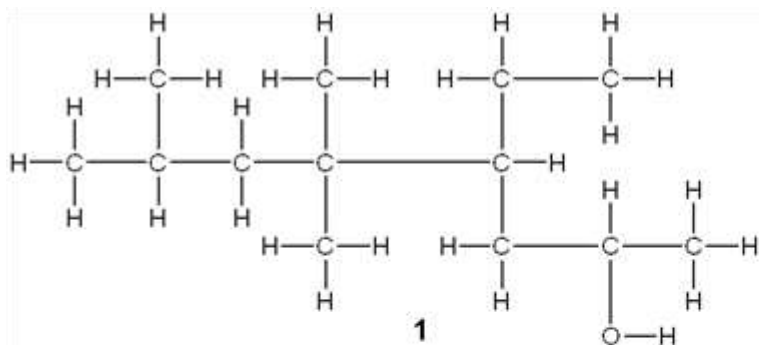
*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

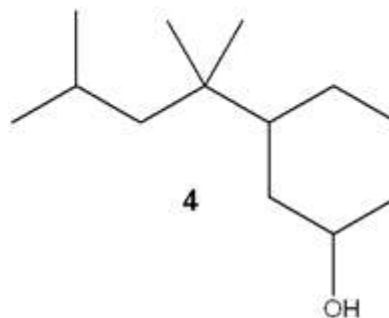
*DATE MODIFIED:* 3/12/2015 3:24 PM

57. Which of the following structures is different from the other three?

## Chapter 02 - Alkanes and Cycloalkanes



**3**



- a. **1**
- b. **2**
- c. **3**
- d. **4**

ANSWER: b

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

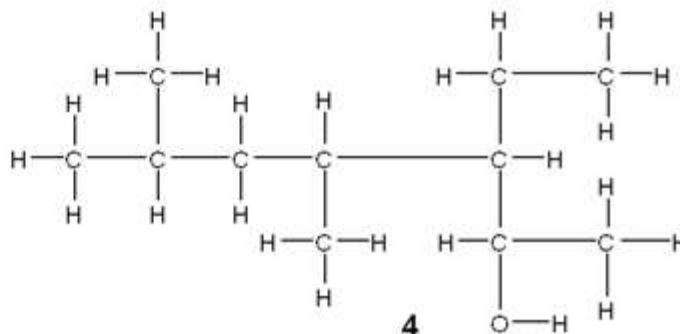
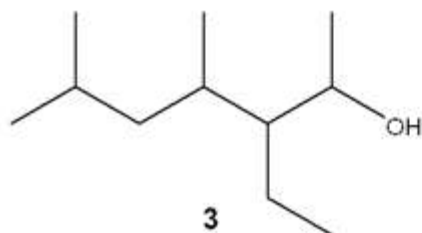
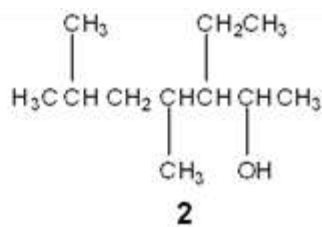
DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

58. Which of the following structures is different from the other three?



**1**



## Chapter 02 - Alkanes and Cycloalkanes

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

ANSWER: a

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

59. Which of the following substituted cyclohexanes has the most negative value of  $\Delta G^\circ$  for ring flipping from the conformation in which the substituent is axial to the one where it is equatorial?

- a. methylcyclohexane
- b. chlorocyclohexane
- c. isopropylcyclohexane
- d. ethynylcyclohexane

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

60. Which of the following substituted cyclohexanes has the most negative value of  $\Delta G^\circ$  for ring flipping from the conformation in which the substituent is axial to the one where it is equatorial?

- a. fluorocyclohexane
- b. methylcyclohexane
- c. ethylcyclohexane
- d. *tert*-butylcyclohexane

ANSWER: d

POINTS: 1

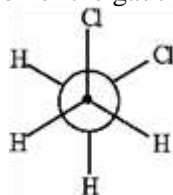
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

61. The Newman projection of the gauche conformation of 1,2-dichloroethane is shown below.



- a. True
- b. False

## Chapter 02 - Alkanes and Cycloalkanes

ANSWER: True

POINTS: 1

QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/10/2017 1:33 AM

62. The most stable conformation of an alkane occurs when carbon-carbon bonds are staggered and bulky groups are anti.

a. True

b. False

ANSWER: True

POINTS: 1

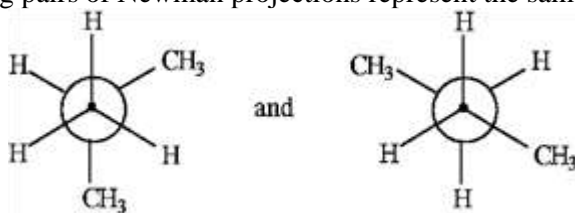
QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

63. The following pairs of Newman projections represent the same compound but in differing conformations.



a. True

b. False

ANSWER: False

POINTS: 1

QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/10/2017 1:38 AM

64. There are four constitutional isomers for the molecular formula  $C_6H_{14}$ .

a. True

b. False

ANSWER: False

POINTS: 1

QUESTION TYPE: True / False

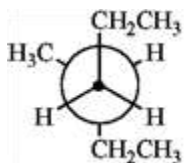
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

65. The following Newman projection represents 2-methylhexane.

## Chapter 02 - Alkanes and Cycloalkanes



- a. True
- b. False

ANSWER: False

POINTS: 1

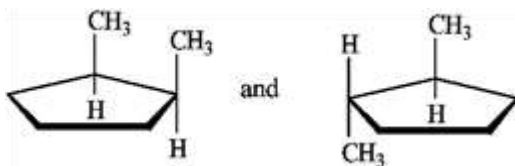
QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/10/2017 1:37 AM

66. The following structures represent, from left to right, a *cis* and a *trans* isomer.



- a. True
- b. False

ANSWER: True

POINTS: 1

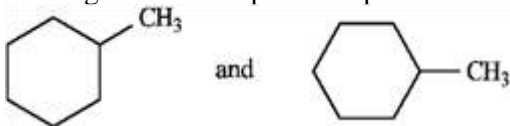
QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/10/2017 1:37 AM

67. The following structures represent a pair of constitutional isomers.



- a. True
- b. False

ANSWER: False

POINTS: 1

QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/10/2017 1:38 AM

68. 3-methylhexylcyclopentane represents a correct IUPAC name.

- a. True
- b. False

ANSWER: False

## Chapter 02 - Alkanes and Cycloalkanes

POINTS: 1

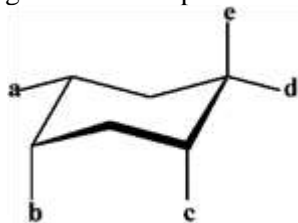
QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

69. In the following structure the positions labeled a and d are equatorial positions.



a. True

b. False

ANSWER: True

POINTS: 1

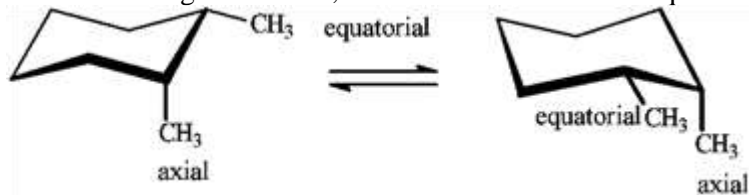
QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/13/2017 2:28 AM

70. In the following conversion, the conformations are of equal stability.



a. True

b. False

ANSWER: True

POINTS: 1

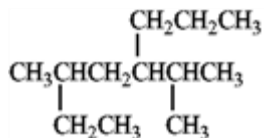
QUESTION TYPE: True / False

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/10/2017 4:39 AM

71. The correct IUPAC name for the following compound is \_\_\_\_\_.



ANSWER: 3-methyl-5-(1-methylethyl)octane

3-methyl-5-isopropyloctane

POINTS: 1



## Chapter 02 - Alkanes and Cycloalkanes

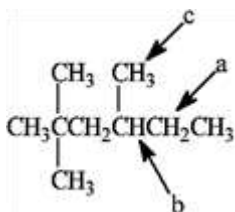
**QUESTION TYPE:** Completion

**HAS VARIABLES:** False

**DATE CREATED:** 3/12/2015 3:24 PM

**DATE MODIFIED:** 3/13/2017 2:29 AM

72. The tertiary carbon atom in the following structure is indicated by the letter\_\_\_\_\_.



**ANSWER:** b

B

**POINTS:** 1

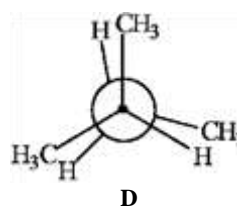
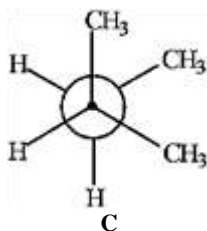
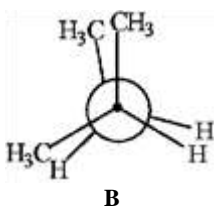
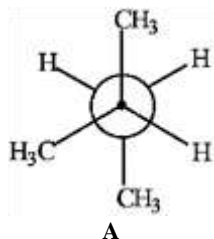
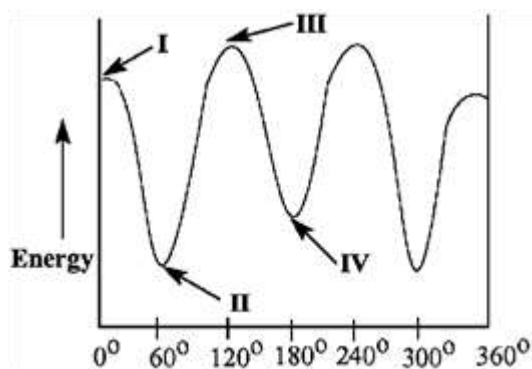
**QUESTION TYPE:** Completion

**HAS VARIABLES:** False

**DATE CREATED:** 3/12/2015 3:24 PM

**DATE MODIFIED:** 3/13/2017 2:30 AM

Match the Newman projection for the conformation of 2-methylbutane to the indicated position on the potential energy diagram.



73. Conformation A is represented by Roman numeral \_\_\_\_\_.

**ANSWER:** II

**POINTS:** 1

**QUESTION TYPE:** Completion

**HAS VARIABLES:** False

**PREFACE NAME:** PE Diagram

## Chapter 02 - Alkanes and Cycloalkanes

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

74. Conformation B is represented by Roman numeral \_\_\_\_.

*ANSWER:* III

*POINTS:* 1

*QUESTION TYPE:* Completion

*HAS VARIABLES:* False

*PREFACE NAME:* PE Diagram

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

75. Conformation C is represented by Roman numeral \_\_\_\_.

*ANSWER:* IV

*POINTS:* 1

*QUESTION TYPE:* Completion

*HAS VARIABLES:* False

*PREFACE NAME:* PE Diagram

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

76. Conformation D is represented by Roman numeral \_\_\_\_.

*ANSWER:* I

*POINTS:* 1

*QUESTION TYPE:* Completion

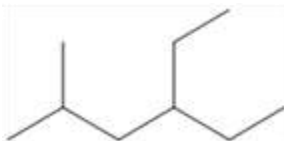
*HAS VARIABLES:* False

*PREFACE NAME:* PE Diagram

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

77. What is the IUPAC name of the following compound?



*ANSWER:* 4-ethyl-2-methylhexane

*POINTS:* 1

*QUESTION TYPE:* Subjective Short Answer

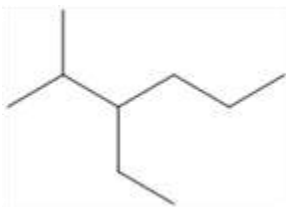
*HAS VARIABLES:* False

*DATE CREATED:* 3/12/2015 3:24 PM

*DATE MODIFIED:* 3/12/2015 3:24 PM

78. What is the IUPAC name of the following compound?

## Chapter 02 - Alkanes and Cycloalkanes



**ANSWER:** 3-ethyl-2-methylhexane

**POINTS:** 1

**QUESTION TYPE:** Subjective Short Answer

**HAS VARIABLES:** False

**DATE CREATED:** 3/12/2015 3:24 PM

**DATE MODIFIED:** 3/12/2015 3:24 PM

79. What is the IUPAC name of the following compound?



**ANSWER:** 2,4,4-trimethylhexane

**POINTS:** 1

**QUESTION TYPE:** Subjective Short Answer

**HAS VARIABLES:** False

**DATE CREATED:** 3/12/2015 3:24 PM

**DATE MODIFIED:** 3/12/2015 3:24 PM

80. What is the IUPAC name of the following compound?



**ANSWER:** 2,2,4-trimethylhexane

**POINTS:** 1

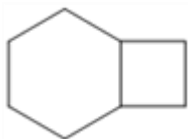
**QUESTION TYPE:** Subjective Short Answer

**HAS VARIABLES:** False

**DATE CREATED:** 3/12/2015 3:24 PM

**DATE MODIFIED:** 3/12/2015 3:24 PM

81. What is the IUPAC name of the following compound?



**ANSWER:** bicyclo[4.2.0]octane

**POINTS:** 1

**QUESTION TYPE:** Subjective Short Answer

**HAS VARIABLES:** False

**DATE CREATED:** 3/12/2015 3:24 PM

**DATE MODIFIED:** 3/12/2015 3:24 PM

## Chapter 02 - Alkanes and Cycloalkanes

82. What is the IUPAC name of the following compound?



ANSWER: bicyclo[2.2.1]heptane

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

83. What is the IUPAC name of the following compound?



ANSWER: *cis*-1-*tert*-butyl-2-methylcyclohexane

*[ignoring absolute stereochemistry in Chap 2]*

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

84. What is the IUPAC name of the following compound?



ANSWER: *cis*-1-isopropyl-3-methylcyclohexane

*[ignoring absolute stereochemistry in Chap 2]*

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

85. How many hydrogen atoms are there in decane?

ANSWER: 22

POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

## Chapter 02 - Alkanes and Cycloalkanes

86. How many hydrogen atoms are there in octane?

ANSWER: 18

POINTS: 1

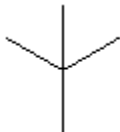
QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

87. What are the common and IUPAC names of the following compound?



ANSWER: *common:* neopentane  
*IUPAC:* 2,2-dimethylpropane

POINTS: 1

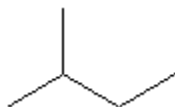
QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

88. What are the common and IUPAC names of the following compound?



ANSWER: *common:* isopentane  
*IUPAC:* 2-dimethylbutane

POINTS: 1

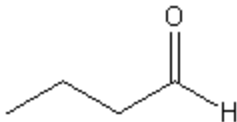
QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

89. What is the IUPAC name of the following compound?



ANSWER: butanal

POINTS: 1

QUESTION TYPE: Subjective Short Answer

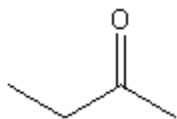
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

90. What is the IUPAC name of the following compound?

## Chapter 02 - Alkanes and Cycloalkanes



ANSWER: butanone

POINTS: 1

QUESTION TYPE: Subjective Short Answer

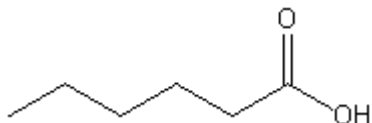
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

91. Provide a line-bond structure of hexanoic acid.

ANSWER:



POINTS: 1

QUESTION TYPE: Subjective Short Answer

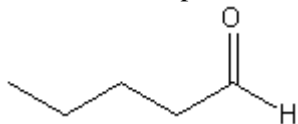
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

92. Provide a line-bond structure of pentanal.

ANSWER:



POINTS: 1

QUESTION TYPE: Subjective Short Answer

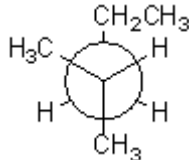
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

93. Provide a Newman projection of the most stable conformation of 2-methylpentane,  $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{CH}_3$ , looking along the C2-C3 bond

ANSWER:



POINTS: 1

QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

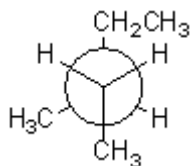
DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/10/2017 5:50 AM

94. Provide a Newman projection of the most stable conformation of 3-methylpentane,  $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$  looking along the C2-C3 bond.

## Chapter 02 - Alkanes and Cycloalkanes

ANSWER:



POINTS: 1

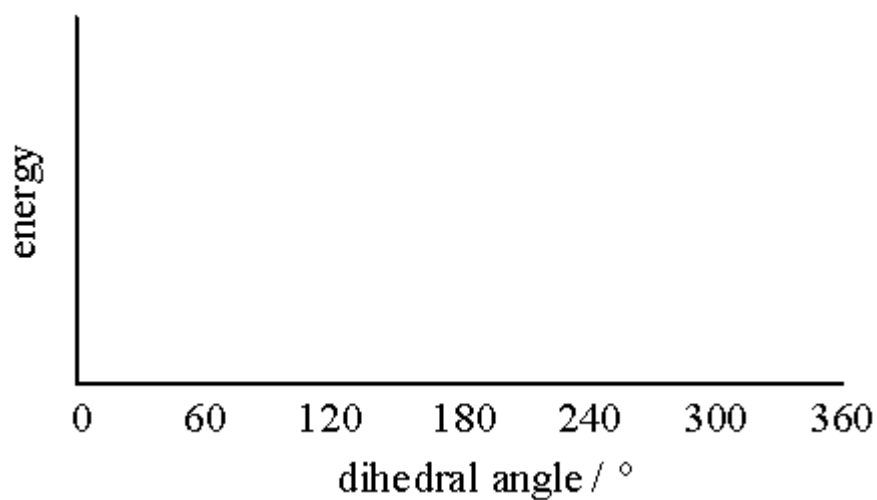
QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

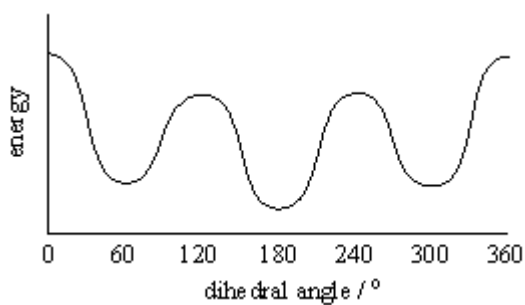
DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

95. Provide a neatly drawn plot of energy versus dihedral angle for rotation around the C2-C3 bond of butane.



ANSWER:



POINTS: 1

QUESTION TYPE: Subjective Short Answer

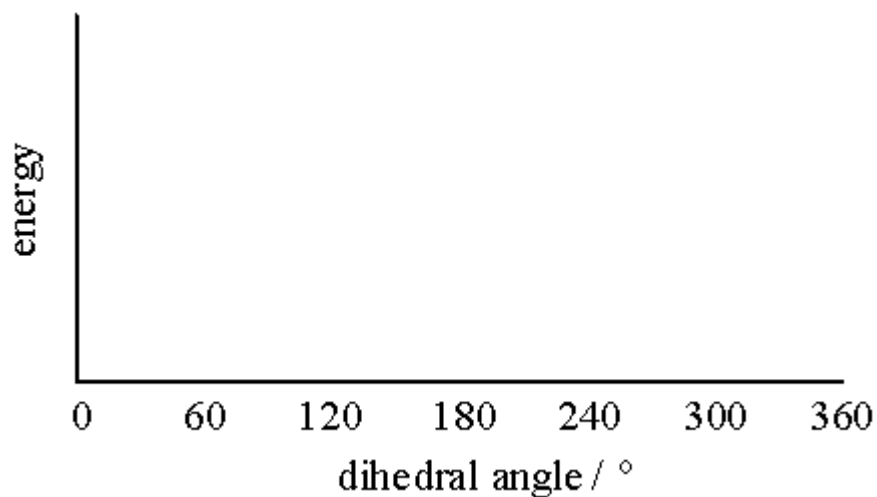
HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

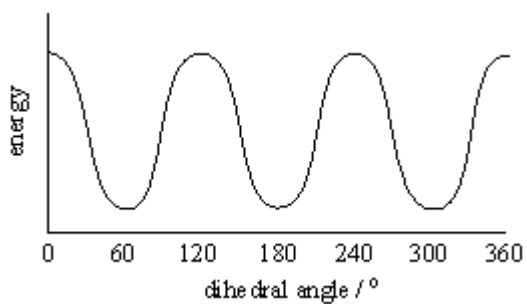
DATE MODIFIED: 3/12/2015 3:24 PM

96. Provide a neatly drawn plot of energy versus dihedral angle for rotation around the C-C bond of ethane.

## Chapter 02 - Alkanes and Cycloalkanes



ANSWER:



POINTS: 1

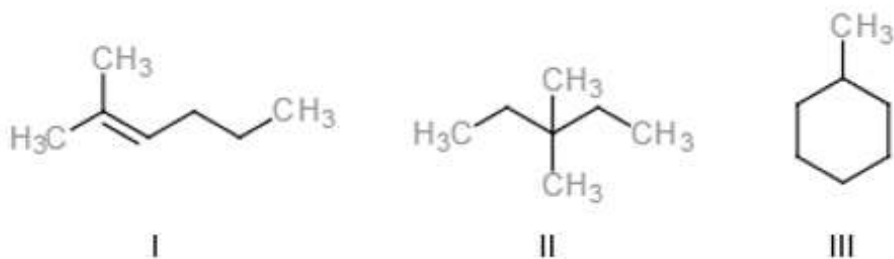
QUESTION TYPE: Subjective Short Answer

HAS VARIABLES: False

DATE CREATED: 3/12/2015 3:24 PM

DATE MODIFIED: 3/12/2015 3:24 PM

97. Identify the constitutional isomer with the molecular formula  $C_7H_{16}$ .



- a. Only I
- b. Only I and II
- c. Only II
- d. I, II, and III

ANSWER: c

POINTS: 1

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 4/11/2017 7:38 AM



## Chapter 02 - Alkanes and Cycloalkanes

DATE MODIFIED: 4/13/2017 1:02 AM

98. The molecular formulas of neopentane and isobutane are \_\_\_\_\_ and \_\_\_\_\_, respectively.

- a.  $C_5H_{12}$ ;  $C_4H_8$
- b.  $C_5H_{10}$ ;  $C_4H_{10}$
- c.  $C_5H_{12}$ ;  $C_4H_{11}$
- d.  $C_5H_{12}$ ;  $C_4H_{10}$

ANSWER: d

POINTS: 1

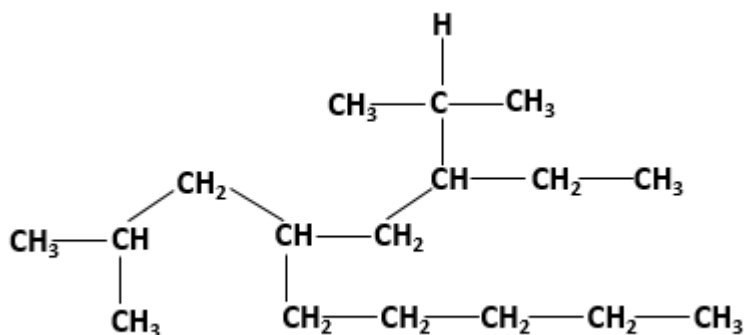
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 4/11/2017 7:54 AM

DATE MODIFIED: 4/11/2017 7:55 AM

99. The total numbers of  $2^\circ$  and  $3^\circ$  carbon atoms in the following structure are \_\_\_\_\_ and \_\_\_\_\_, respectively.



- a. 3; 7
- b. 7; 4
- c. 4; 6
- d. 6; 4

ANSWER: b

POINTS: 1

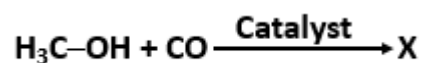
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 4/11/2017 7:57 AM

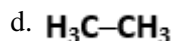
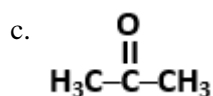
DATE MODIFIED: 4/11/2017 8:00 AM

100. What is "X" in the following reaction?



- a.  $\begin{array}{c} O \\ || \\ H_3C-C-OH \end{array}$
- b.  $HC \equiv CH$

Chapter 02 - Alkanes and Cycloalkanes



ANSWER: a

POINTS: 1

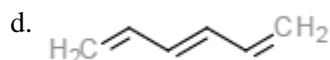
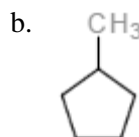
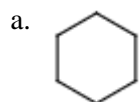
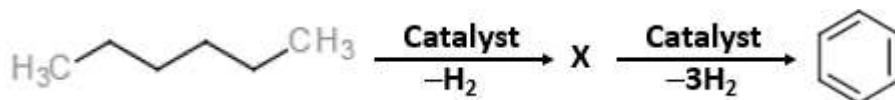
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 4/11/2017 8:01 AM

DATE MODIFIED: 4/11/2017 8:09 AM

101. What is "X" in the following reaction?



ANSWER: a

POINTS: 1

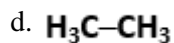
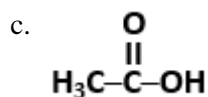
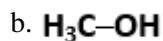
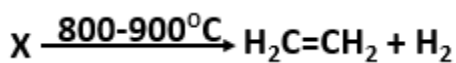
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 4/11/2017 8:04 AM

DATE MODIFIED: 4/11/2017 8:09 AM

102. What is "X" in the following reaction?



ANSWER: d

## Chapter 02 - Alkanes and Cycloalkanes

POINTS: 1

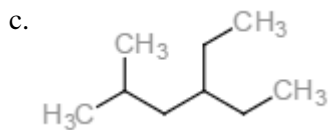
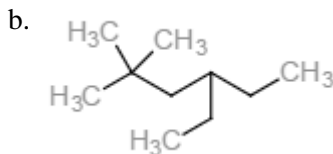
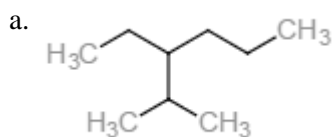
QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

DATE CREATED: 4/11/2017 8:10 AM

DATE MODIFIED: 4/19/2017 12:56 AM

Match the structures with their IUPAC names.



QUESTION TYPE: Matching

HAS VARIABLES: False

DATE CREATED: 4/11/2017 8:15 AM

DATE MODIFIED: 4/11/2017 8:26 AM

103. 3-ethyl-2-methylhexane

ANSWER: a

POINTS: 1

104. 4-ethyl-2,2-dimethylhexane

ANSWER: b

POINTS: 1

105. 4-ethyl-2-methylhexane

ANSWER: c

POINTS: 1