



THE UNIVERSITY OF
TOLEDO
1872

CHEM 2410 – Organic Chemistry I

CHEM 2410 Fall 2018 – Mid-Term Exam 1 09-26-18

Time: 5:30pm – 6:30pm

Student Name: _____

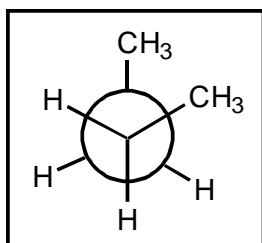
Student Number: _____

Instructor: Prof. Andreana
Room #: WO 1205

1. How many isomers of C_4H_9Br are possible?

- A) two
- B) three
- C) four
- D) five
- E) six

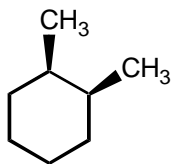
2. What is the name given to the Newman projection of the butane conformation shown here?



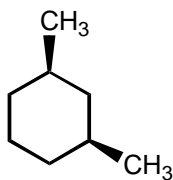
- A) anti
- B) gauche
- C) staggered
- D) eclipsed
- E) skewed

3. Which of the following could have **both** methyl groups in an **equatorial** orientation?

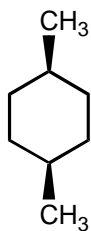
A)



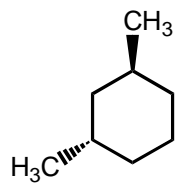
B)



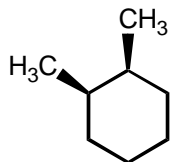
C)



D)

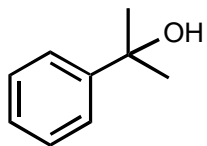


E)

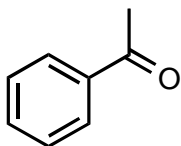


4. Which one of the following structures must be incorrect?

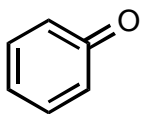
A)



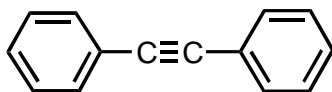
B)



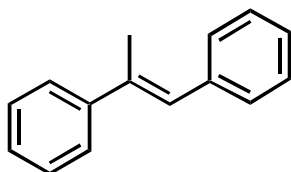
C)



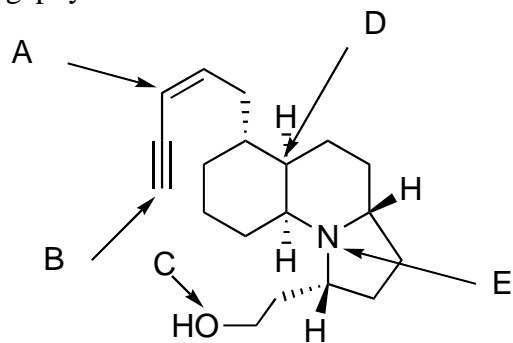
D)



E)



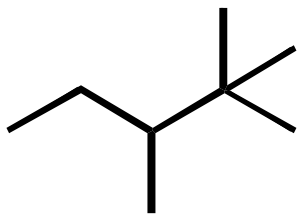
5. What is the hybridization of the each of the labeled atoms for the potent neurotoxin (-)-gephyrotoxin?



(-)-gephyrotoxin
 source: poison frog
 activity: neurotoxin

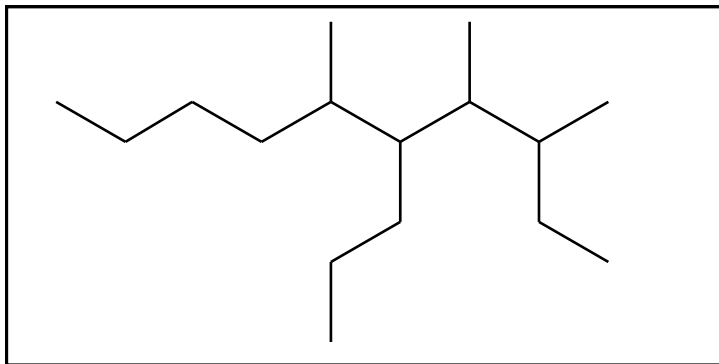
- A) A = sp^2 , B = sp , C = sp^2 , D = sp^3 , E = sp^3
- B) A = sp^2 , B = sp , C = sp^3 , D = sp^3 , E = sp^2
- C) A = sp^2 , B = sp , C = sp^2 , D = sp^3 , E = sp^2
- D) A = sp^2 , B = sp , C = sp^3 , D = sp^3 , E = sp^3
- E) A = sp , B = sp , C = sp^3 , D = sp^3 , E = sp^3

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



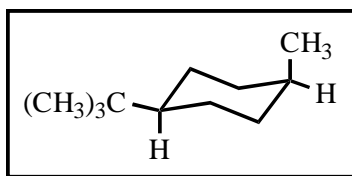
- A) 0
- B) 1
- C) 2
- D) 3
- E) 4

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



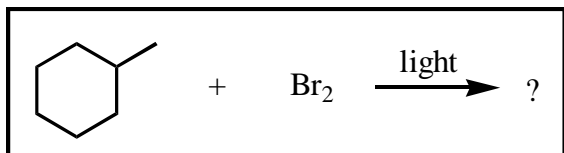
- A) 6-propyl-5,7,8-trimethyldecane
- B) 5,7,8-trimethyl-6-propyldecane
- C) 3,4,6-trimethyl-5-propyldecane
- D) 5-propyl-3,4,6-trimethyldecane
- E) none of the above

8. What would be the proper name of the following:

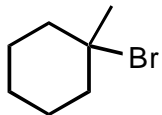


- A) *cis*-1-tert-butyl-4-methylcyclohexane
- B) *trans*-1-tert-butyl-4-methylcyclohexane
- C) axial,equatorial-1-tert-butyl-4-methylcyclohexane
- D) *cis*-1-isopropyl-4-methylcyclohexane
- E) *trans*-1-isopropyl-4-methylcyclohexane

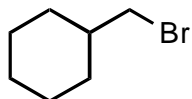
9. What is the major product of the following reaction?



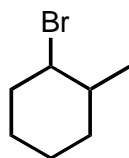
A)



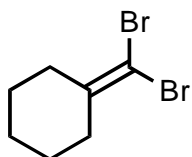
B)



C)

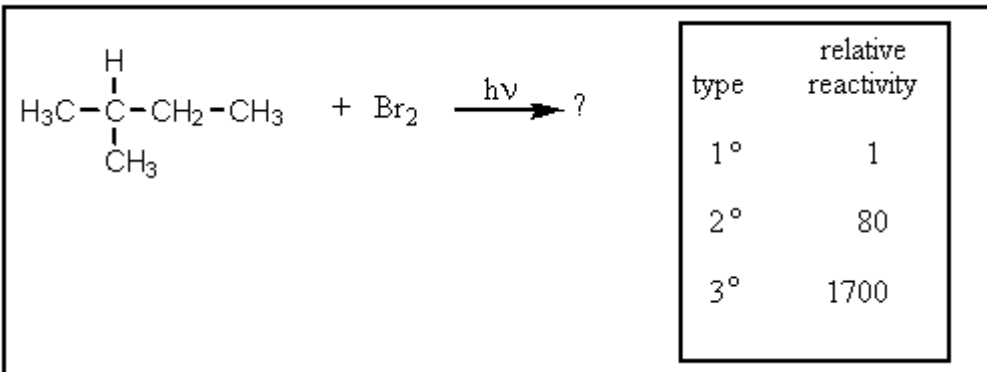


D)

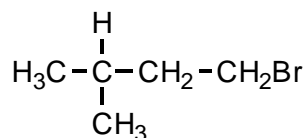


E) no reaction occurs

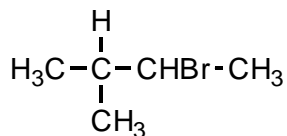
10. Given the relative reactivities of various kinds of hydrogens, the **major** product expected from mono-bromination of 2-methylbutane would be what?



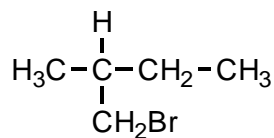
A)



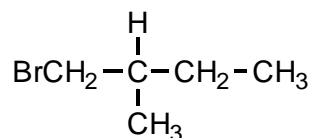
B)



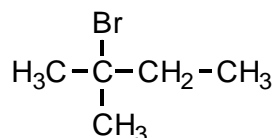
C)



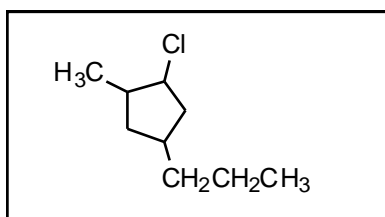
D)



E)

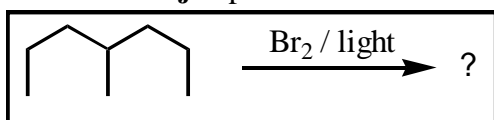


11. What is the correct name for the following molecule?

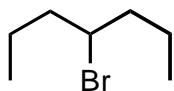


- A) 1-chloro-2-methyl-4-propylcyclopentane
- B) 2-chloro-1-methyl-4-propylcyclopentane
- C) 1-chloro-5-methyl-3-propylcyclopentane
- D) 5-methyl-1-chloro-3-propylcyclopentane
- E) 1-chloro-3-propyl-5-methylcyclopentane

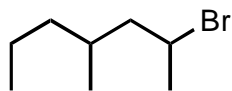
12. Predict the **major** product of the following reaction:



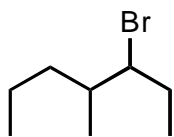
A)



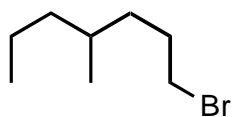
B)



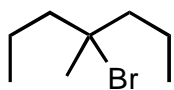
C)



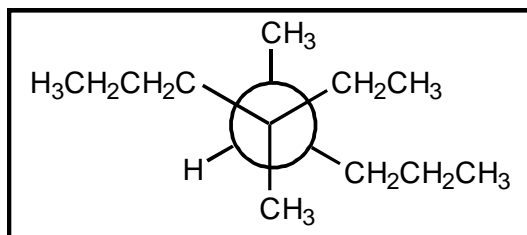
D)



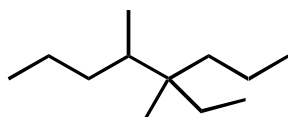
E)



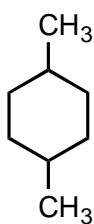
13. The following Newman projection represents which molecule?



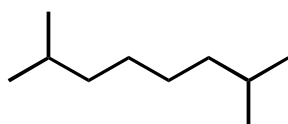
A)



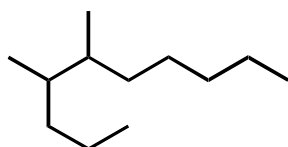
B)



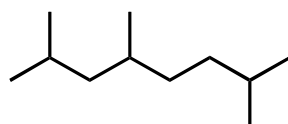
C)



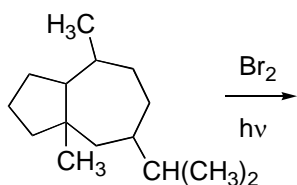
D)



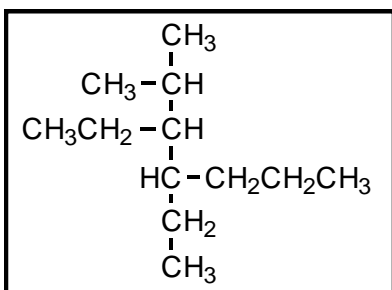
E)



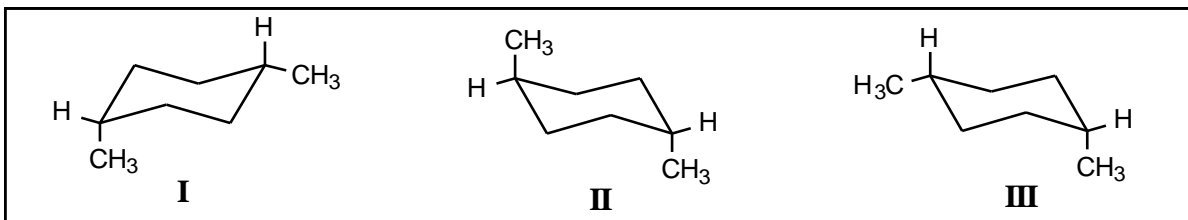
14. How many different products will result if radical **monobromination** of the following compound only occurs at 3° carbons.



- A) 0
 B) 1
 C) 2
 D) 3
 E) 4
15. How would the following molecule be properly named?

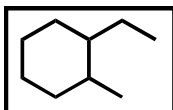


- A) 3-ethyl-2-methyl-4-propylhexane
 B) 3,4-diethyl-2-methylheptane
 C) 4-ethyl-3-isopropylheptane
 D) 3-isopropyl-4-propylhexane
 E) none of the above
16. Which of the following structures represent *cis*-1,4-dimethylcyclohexane?



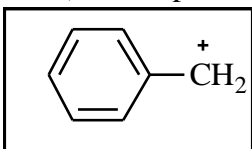
- A) I & II
 B) I & III
 C) II & III
 D) all of the above
 E) none of the above

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



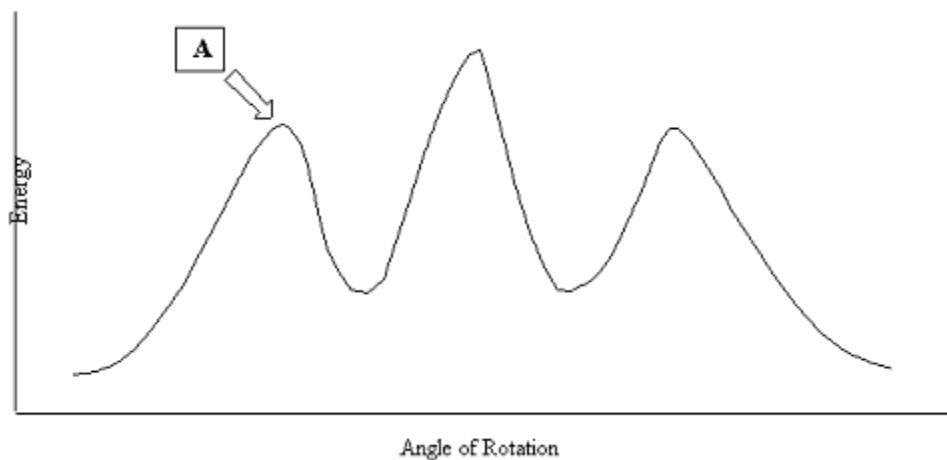
- A) 1-ethyl-2-methylhexane
- B) 2-ethyl-1-methylcycloheptane
- C) 4-ethyl-5-methylcyclohexane
- D) 1-ethyl-2-methylcyclohexane
- E) 1-methyloctane

18. How many different resonance structures can be drawn for the benzyl cation (shown below) which place the plus charge on a carbon atom in the ring?

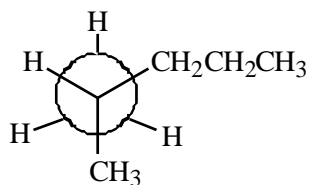


- A) 1
- B) 2
- C) 3
- D) 5
- E) 6

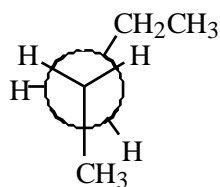
19. Consider the potential energy diagram for rotation about the C2–C3 bond in pentane. The position marked "A" most likely corresponds to which of the following Newman projections?



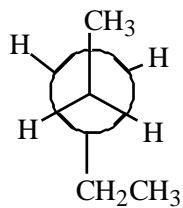
A)



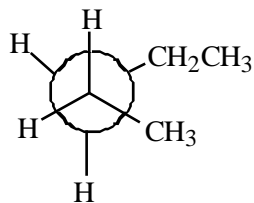
B)



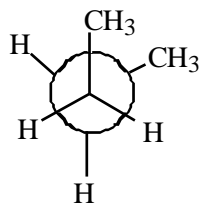
C)



D)



E)



20. Which of the following disubstituted cyclohexanes could exist in a conformation that has both groups equatorial?
- A) *cis*-1,3-dimethylcyclohexane
 - B) *cis*-1,4-dimethylcyclohexane
 - C) *trans*-1,3-dimethylcyclohexane
 - D) *cis*-1,2-dimethylcyclohexane
 - E) All or none can have both groups equatorial.

Answer Key

1. C
2. B
3. B
4. C
5. D
6. B
7. C
8. A
9. A
10. E
11. A
12. E
13. A
14. E
15. B/C (B is the correct answer, however, C accepted as well)
16. B
17. D
18. C
19. B
20. A