



THE UNIVERSITY OF
TOLEDO
1872

CHEM 2410 – Organic Chemistry I

CHEM 2410 Fall 2016 – Mid-Term Exam 1 09-21-16

Time: 5:45pm – 6:45pm

Student Name: _____

Student Number: _____

Instructor: Prof. Andreeana
Room #: RH 1520

Name _____

Student# _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1. What is the ground-state electronic configuration of a nitrogen atom (nitrogen: atomic number 7)?

- a. $1s^2 2s^1 2p^4$
- b. $1s^2 2s^2 2p^3$
- c. $1s^1 2s^1 2p^5$
- d. $1s^2 2s^2 2p^2$

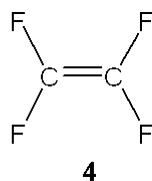
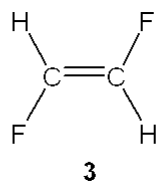
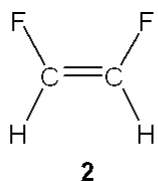
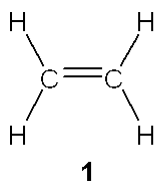
2. Which of the following compounds is a carboxylic acid?

- a. $\text{CH}_3\text{CH}_2\text{COOH}$
- b. $\text{CH}_3\text{CH}_2\text{OCH}_3$
- c. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- d. $\text{CH}_3\text{CH}_2\text{CHO}$

3. Which of the following is a tertiary amine?

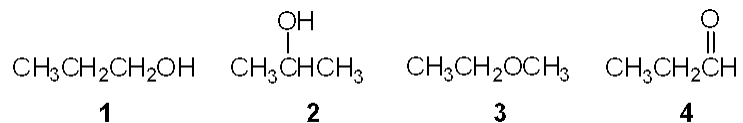
- a. $\text{CH}_3\text{CH}_2\text{N}(\text{CH}_3)_2$
- b. $(\text{CH}_3)_3\text{CNH}_2$
- c. $\text{CH}_3\text{CH}_2\text{NHCH}_3$
- d. $\text{CH}_3\text{CH}_2\text{NHCH}(\text{CH}_3)_2$

4. Which of the following molecules has a molecular dipole?



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

5. Which of the following is a primary (1°) alcohol?

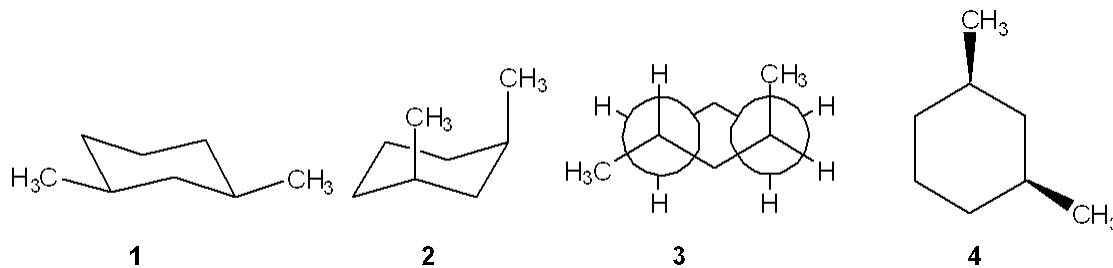


- a. **1**
- b. **2**
- c. **3**
- d. **4**

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

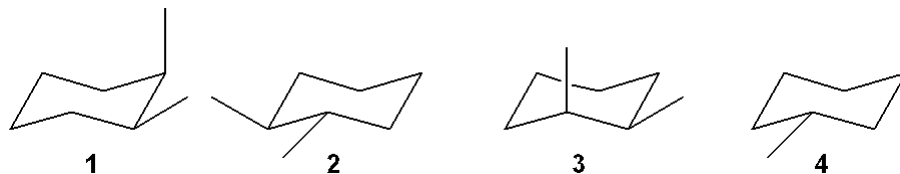
- a. *cis*-1,2-dimethylcyclohexane
- b. *cis*-1,3-dimethylcyclohexane
- c. *trans*-1,3-dimethylcyclohexane
- d. *cis*-1,4-dimethylcyclohexane

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



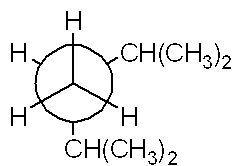
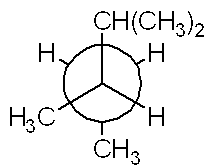
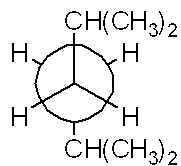
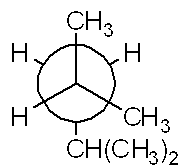
- a. **1**
- b. **2**
- c. **3**
- d. **4**

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



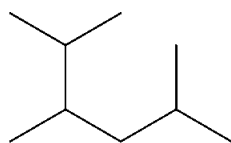
- a. **1**
- b. **2**
- c. **3**
- d. **4**

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



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

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

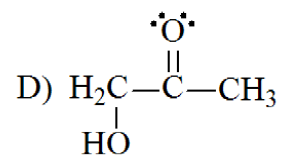
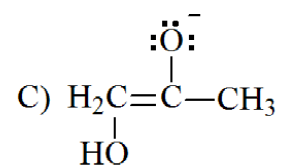
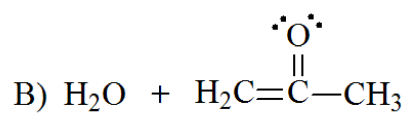
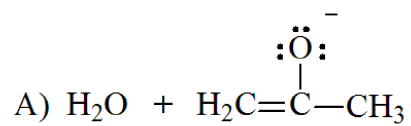
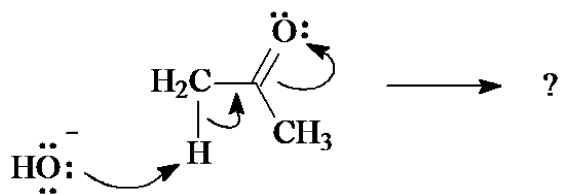


- a. 2-isopropyl-5-methylpentane
- b. 5-isopropyl-2-methylpentane
- c. 2,3,5-trimethylhexane
- d. 1,2-diisopropylpropane

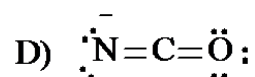
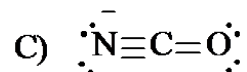
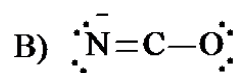
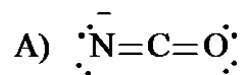
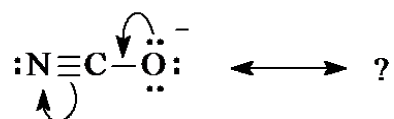
11. How many constitutional isomers are there with the molecular formula C_6H_{14} ?

- a. 3
- b. 4
- c. 5
- d. 8

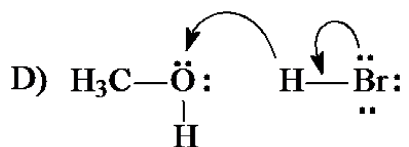
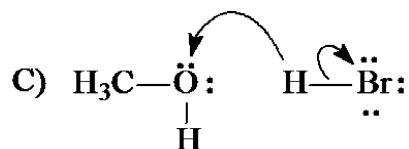
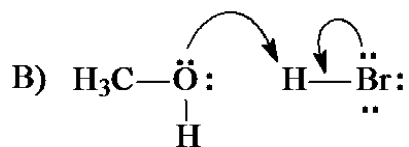
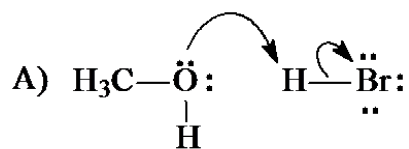
12. Identify the species which results from the following movement of electron pairs.



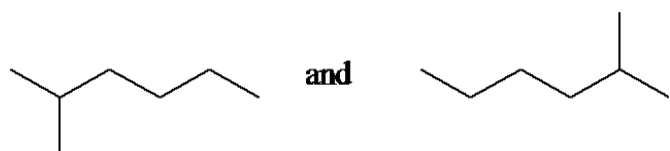
13. Identify the resonance structure which results from the following "electron pair movements".



14. Which one of the following mechanistically depicts the protonation of methanol by hydrogen bromide?

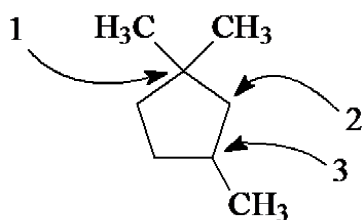


15. What is the relationship between the following two structures?



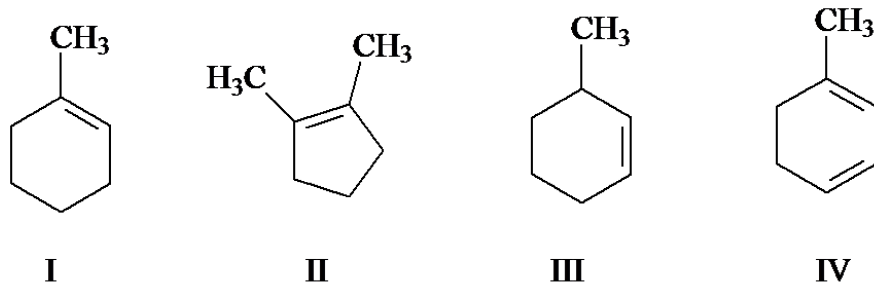
- A. identical structures
- B. resonance forms
- C. constitutional isomers
- D. different compounds with different compositions

16. Carbon atoms 1, 2, and 3 in the following structure are classified, respectively, as



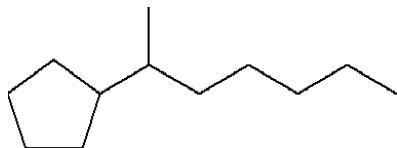
- A. tertiary, primary, secondary.
- B. quaternary, primary, tertiary.
- C. quaternary, secondary, secondary.
- D. quaternary, secondary, tertiary.

17. Which of the following are constitutional isomers?



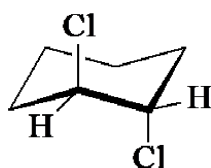
- A. I, II, and III
- B. I, III, and IV
- C. only I and III
- D. all are constitutional isomers

18. The correct IUPAC name of the following compound is



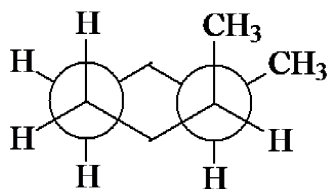
- A. (1-methylhexyl)cyclopentane.
- B. (1-pentylethyl)cyclopentane.
- C. 2-cyclopentylheptane.
- D. 1-cyclopentyl-2-heptane.

19. Identify the spatial relationship of the two chlorine atoms.



- A. gauche
- B. anti
- C. eclipsed
- D. twist

20. The IUPAC name of the following compound is



- A. *cis*-1,2-dimethylcyclohexane.
- B. *trans*-1,2-dimethylcyclohexane.
- C. 1,1-dimethylcyclohexane.
- D. *cis*-1,3-dimethylcyclohexane.

Answer Key

1. B
2. A
3. A
4. B
5. A
6. B
7. C
8. B
9. A
10. C
11. C
12. A
13. A
14. A
15. A
16. D
17. A
18. C
19. B
20. A