



THE UNIVERSITY OF
TOLEDO
1872

CHEM 2410 – Organic Chemistry I

CHEM 2410 Fall 2017 – Mid-Term Exam 1 09-27-17

Time: 5:30pm – 6:30pm

Student Name: _____

Student Number: _____

Instructor: Prof. Andreana
Room #: WO 1205

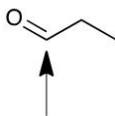
Exam #1 CHEM 2410 Organic Chemistry I

Name _____

Student# _____

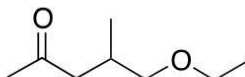
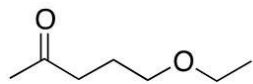
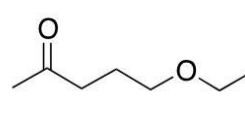
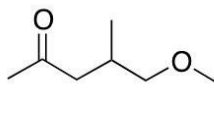
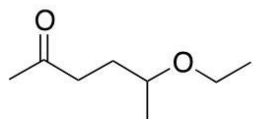
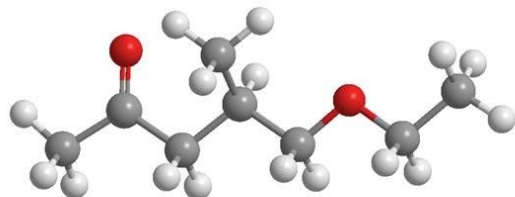
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Propanal is a compound detected on the surface of comet 67P by the Philae Lander. How many sp^2 hybridized atoms are in this molecule?



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

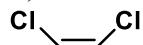
2) Convert the model below into skeletal structure.



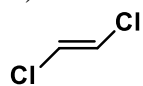
- A) I
- B) II
- C) III
- D) IV
- E) V

3) Which of the following molecules has a net dipole moment of zero?

A)



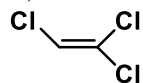
B)



C)



D)



E)



4) Identify the compound with the weakest bond.

A) H₂

B) HF

C) HCl

D) HBr

E) HI

5) Identify the hybridization of carbon in H₂CO.

A) sp

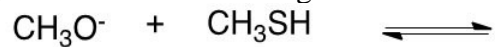
B) sp²

C) sp³

D) sp⁴

E) s³p

6) What would be the conjugate acid in the following acid base reaction?



A) CH₂O

B) CH₃OH

C) CH₃SH₂⁺

D) CH₃S⁻

E) H₂O

7) Identify the most acidic carboxylic acid.

- A) ICH_2COOH
- B) BrCH_2COOH
- C) CH_3COOH
- D) FCH_2COOH
- E) ClCH_2COOH

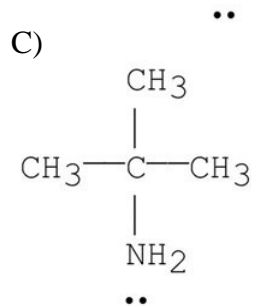
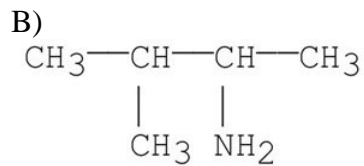
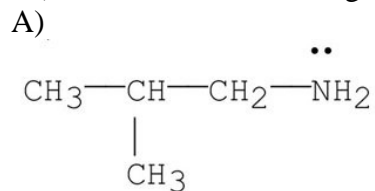
8) Identify the compound with the highest pK_a .

- A) CH_3CH_3
- B) HCCH
- C) CH_2CH_2
- D) CH_3OH
- E) CH_3NH_2

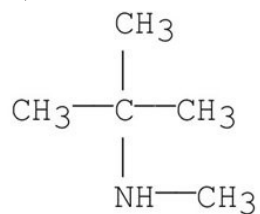
9) What is the conjugate acid of CH_3NH_2 ?

- A) CH_3NH_3^+
- B) CH_3NH^-
- C) NH_4^+
- D) NH_2^-

10) Which of the following is a tertiary amine?

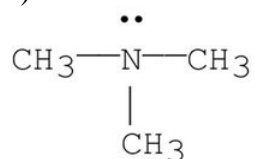


D)

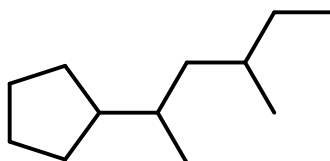


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E)

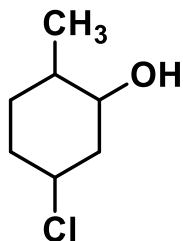


11) Name the compound.



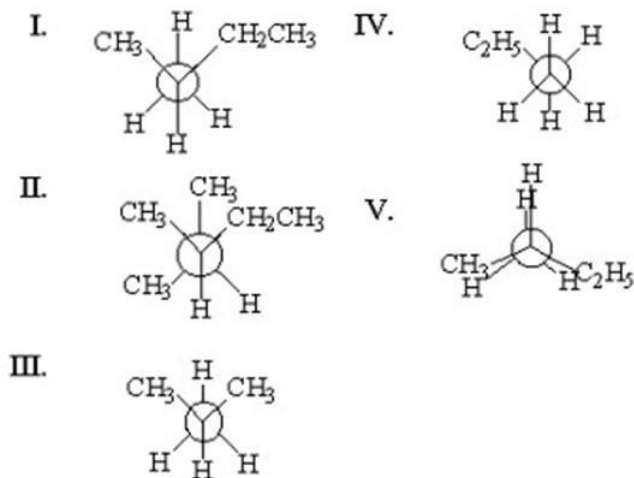
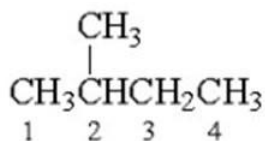
- A) 2-cyclopentyl-4-methylhexane
- B) 5-cyclopentyl-3-methylhexane
- C) 1-cyclopentyl-1,3-dimethylpentane
- D) 2-cyclopentyl-4-methylheptane
- E) 5-cyclopentyl-3-methylheptane

12) Give the IUPAC name for the following structure.



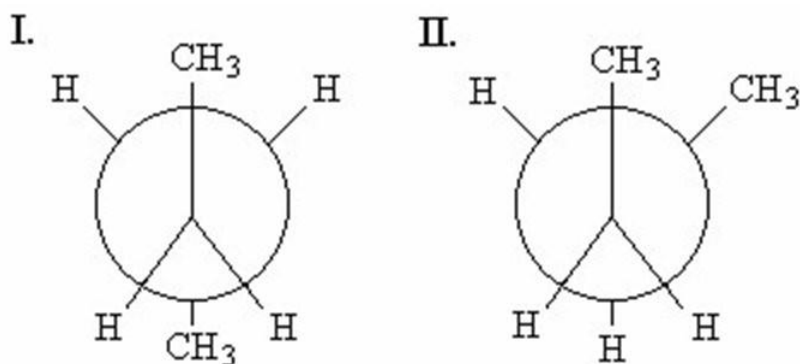
- A) 3-chloro-6-methylcyclohexanol
- B) 2-methyl-5-chlorocyclohexanol
- C) 1-chloro-4-methylcyclohexanol
- D) 5-chloro-2-methylcyclohexanol
- E) 2-methyl-3-chlorocyclohexanol

13) Which of the following is the staggered conformation for rotation about the C₁—C₂ bond in the following structure?



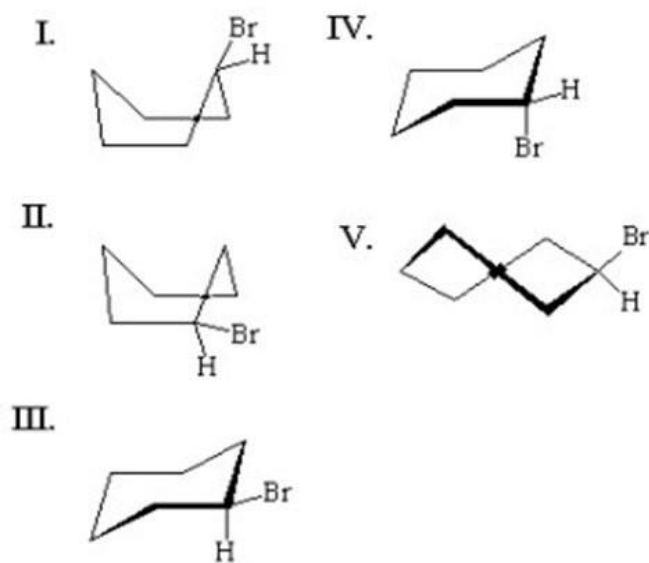
- A) I
- B) II
- C) III
- D) IV
- E) V

14) Which of the following best explains the reason for the relative stabilities of the conformers shown?



- A) I has more torsional strain.
- B) I has more steric strain.
- C) II has more torsional strain.
- D) II has more steric strain.

15) Which of the following is the most stable conformation of bromocyclohexane?



- A) I
- B) II
- C) III
- D) IV
- E) V

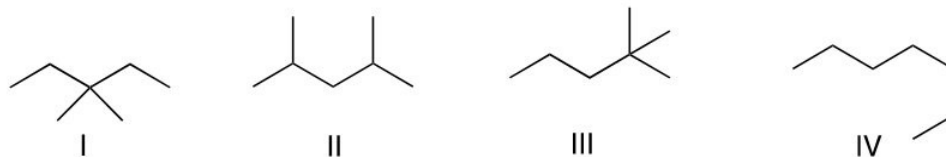
16) Which of the following has two equatorial alkyl substituents in its most stable conformation?

- A) 1,1-dimethylcyclohexane
- B) *cis*-1,2-dimethylcyclohexane
- C) *cis*-1,3-diethylcyclohexane
- D) *cis*-1,4-diethylcyclohexane
- E) *trans*-1,3-diethylcyclohexane

17) Identify the least stable conformation for 1-*tert*-butyl-3-methylcyclohexane.

- A) *tert*-butyl is axial and the methyl is equatorial.
- B) *tert*-butyl is axial and the methyl is axial.
- C) *tert*-butyl is equatorial and the methyl is axial.
- D) *tert*-butyl is equatorial and the methyl is equatorial.
- E) All are equally stable.

18) Which of the following represent constitutional isomers?



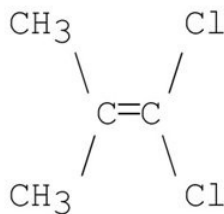
- A) I and II
- B) I and III
- C) I and IV
- D) II and III
- E) I, II, III and IV

19) How many axial hydrogens are present in this molecule?



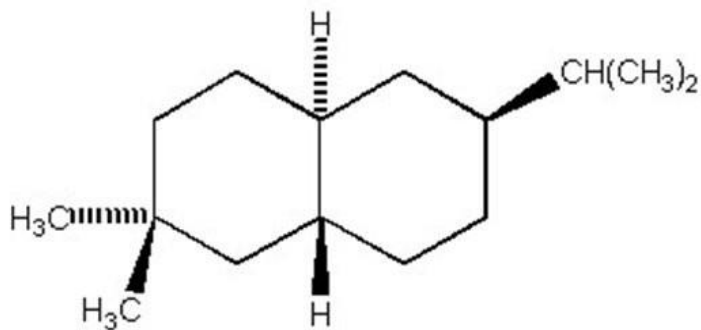
- A) 2
- B) 3
- C) 4
- D) 5
- E) 6

20) Does the following compound have the *E* or *Z* configuration?



- A) *E*
- B) *Z*
- C) neither *E* nor *Z*

21) How many asymmetric centers does the following compound have? (Bonus 5 PTS)



- A) 1
- B) 2
- C) 3
- D) 4
- E) 5