Chemistry 210 - Chapter 6 - quiz 1

Student: _____

1. Which one of the following is not a metal catalyst for the hydrogenation of an alkene?

   A. Pd
   B. Pt
   C. Na
   D. Ni

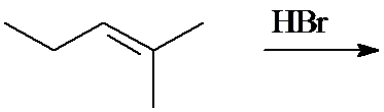
2. Which of the following alkenes is expected to have the highest heat of hydrogenation?

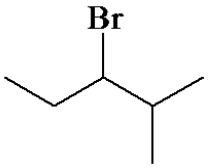
   A. 1-pentene
   B. *trans*-2-pentene
   C. *cis*-2-pentene
   D. 2-methyl-2-butene

3. The stereochemical pathway for the hydrogenation of an alkene with a metal catalyst, such as platinum, occurs *via*:

   A. syn addition
   B. anti addition
   C. Markovnikov addition
   D. anti-Markovnikov addition

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



A)


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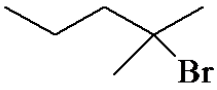

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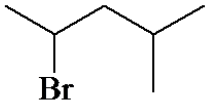

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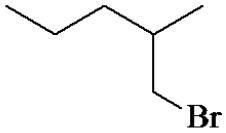


A. A
B. B
C. C
D. D

5. Which of the following is not a possible reaction of a carbocation?

A. addition of a nucleophile
B. rearrangement to a more stable carbocation
C. addition of a proton to form an alkane
D. loss of a β-hydrogen to form an alkene

6. Predict which of the following alkenes reacts the fastest with HCl?

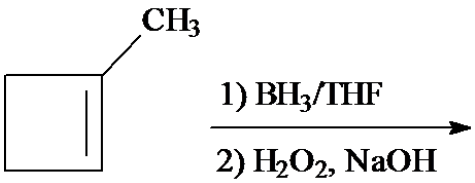
A. $CH_3CH_2CH_2CH_2CH=CH_2$
B. *cis*-$CH_3CH_2CH=CHCH_2CH_3$
C. *trans*-$CH_3CH_2CH=CHCH_2CH_3$
D. $(CH_3)_2C=CHCH_2CH_3$

7. Which reagent(s) below would work best in converting 2-methyl-2-hexene to 2-methyl-3-hexanol?

A) (1) H_2SO_4 (2) H_2O
B) 50% H_2SO_4/H_2O
C) (1) BH_3/THF (2) H_2O_2, NaOH
D) Br_2/H_2O

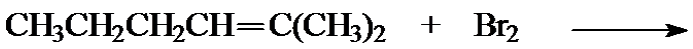
A. A
B. B
C. C
D. D

8. What is(are) the product(s) of the following hydroboration-oxidation reaction?



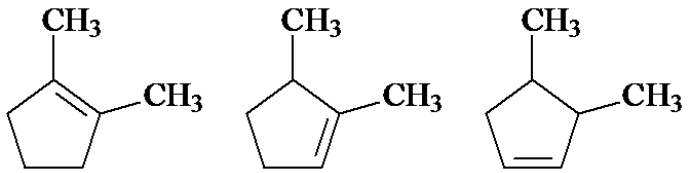
A. 1-methylcyclobutanol
B. *trans*-2-methylcyclobutanol
C. *cis*-2-methylcyclobutanol
D. equal amounts of 2 and 3

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



A. 1,2-dibromo-2-methylhexane
B. 2,2-dibromo-2-methylhexane
C. 2,3-dibromo-2-methylhexane
D. 2,4-dibromo-2-methylhexane

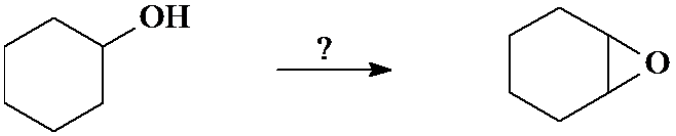
10. Rank the following in order of decreasing reactivity with bromine, Br_2.



I II III

A. I > II > III
B. II > III > I
C. III > I > II
D. III > II > I

11. Which of the following series of reactions would convert cyclohexanol to 1,2-epoxycyclohexane?



A) (1) $NaOCH_2CH_3$ (2) Br_2, H_2O

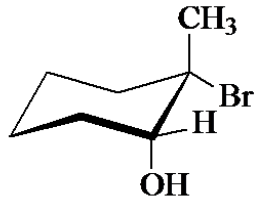
B) (1) Br_2, light (2) $NaOCH_2CH_3$

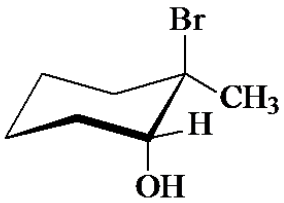
C) (1) H_2SO_4, heat (2) $CH_3\overset{\overset{O}{\|}}{C}OOH$, CH_3CO_2H

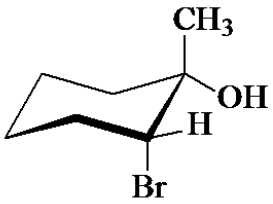
D) (1) H_2SO_4, heat (2) O_3 (3) Zn, H_2O

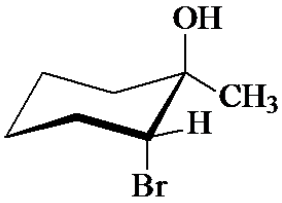
A. A
B. B
C. C
D. D

12. Addition of hypobromous acid, HOBr, to 1-methylcyclohexene gives:

A) 

B) 

C) 

D) 

A. A
B. B
C. C
D. D

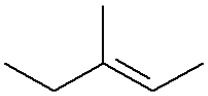
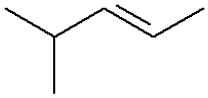
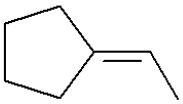
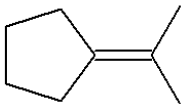
13. A compound, $C_{20}H_{30}$, can be hydrogenated with platinum metal and hydrogen to give a compound $C_{20}H_{38}$. How many double bonds (DB) and rings (R) does the original compound have? (The original compound has no triple bonds.)

A. 4 DB, 2 R
B. 4 DB, 1 R
C. 3 DB, 3 R
D. 2 DB, 4 R

14. The reaction of 1-butene with bromine, Br_2, in aqueous solution gives primarily 1-bromo-2-butanol. Identify the nucleophilic species in the reaction.

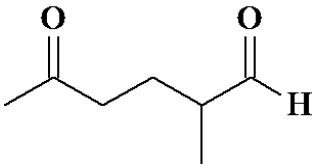
A. Br_2
B. $Br^{\ominus}$
C. H_2O
D. HOBr

15. Which of the following gives acetone, $(CH_3)_2C{=}O$, as one of the products of its ozonolysis?

A)  B)  C)  D) 

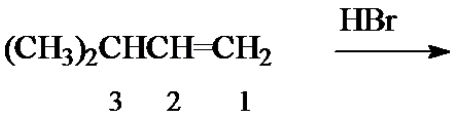
A. A
B. B
C. C
D. D

16. A compound, $C_7H_{13}Cl$, is reacted with sodium ethoxide and gives a single elimination product, C_7H_{12}. Treatment with ozone followed by zinc and water gives the compound below. Identify the original compound.



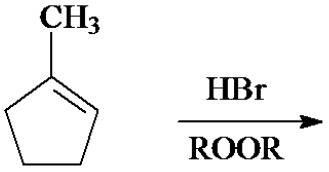
A. 2-chloro-1,1-dimethylcyclopentane
B. 1-chloro-1,2-dimethylcyclopentane
C. 4-chloro-1,2-dimethylcyclopentane
D. 2-chloro-1,3-dimethylcyclopentane

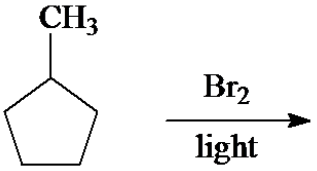
17. The rearrangement which occurs in the following reaction can be described as a:

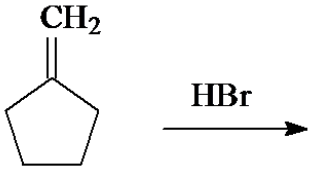


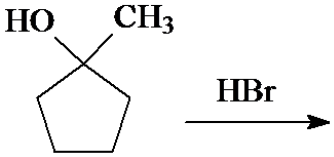
A. hydride shift from C-2 to C-1
B. hydride shift from C-3 to C-2
C. proton shift from C-2 to C-1
D. methyl group shift from C-3 to C-2

18. Which of the following does <u>not</u> give 1-bromo-1-methylcyclopentane as the major product?

A) 

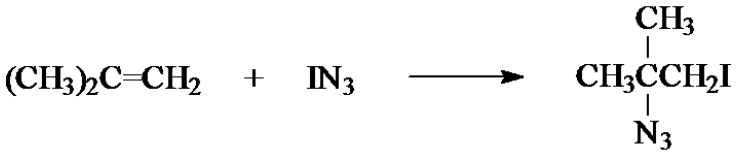
B) 

C) 

D) 

A. A
B. B
C. C
D. D

19. Identify the nucleophile in the following electrophilic addition reaction.



A) $N_3^{\ominus}$

B) $N_3^{\oplus}$

C) $I^{\oplus}$

D) $I^{\ominus}$

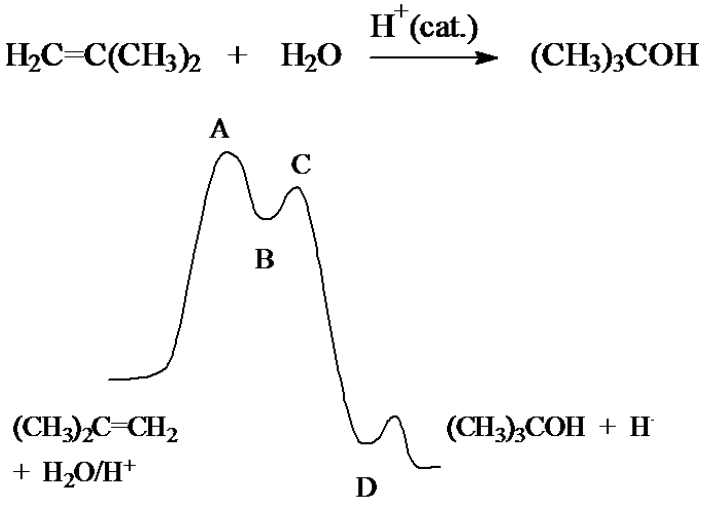
A. A
B. B
C. C
D. D

20. Which reaction sequence below would work best in converting 3-pentanol into 2,3-dibromopentane?

A) (1) H_2SO_4, heat	(2) HBr	(3) Br_2, light
B) (1) H_2SO_4, heat	(2) H_2/Pt	(3) 2 Br_2, light
C) (1) Br_2, light	(2) H_2SO_4, heat	(3) H_2/Pt
D) (1) H_2SO_4, heat	(2) Br_2	

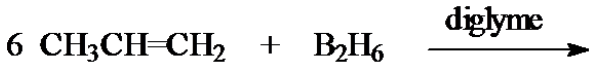
A. A
B. B
C. C
D. D

21. Which point on the potential energy diagram corresponds to the carbocation intermediate, $(CH_3)_3C^+$, for the reaction shown below?



A. A
B. B
C. C
D. D

22. What is the product in the following reaction?



A. $(CH_3CH_2CH_2)_3B$
B. $[(CH_3)_2CH]_3B$
C. $CH_3CH_2CH_3$
D. polypropylene

Chemistry 210 - Chapter 6 - quiz 1 Key

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

Chemistry 210 - Chapter 6 - quiz 1 Summary

Category	*# of Questions*
Carey - 006 Reactions...	22