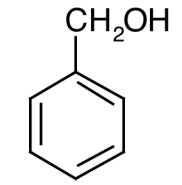
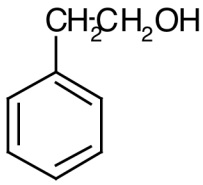
# "Grade or Education" = 1

**CHEM 2261/01**
**Summer 08**
**Exam 4**
**Chapters 10, 11, 14**

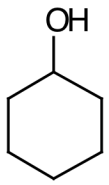
1. Choose the CORRECT statement from the multiple choices concerning compounds with the numbered structures shown below.



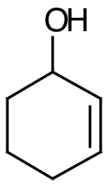

**1**



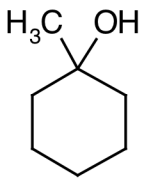

**2**



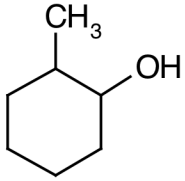

**3**



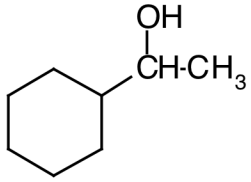

**4**



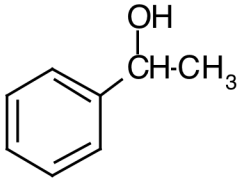

**5**




**6**




**7**




**8**

__ A. 6 will undergo dehydration more rapidly than 5 when heated with $H_2SO_4$.

__ B. 8 will undergo dehydration more rapidly than 2 when heated with $H_2SO_4$.

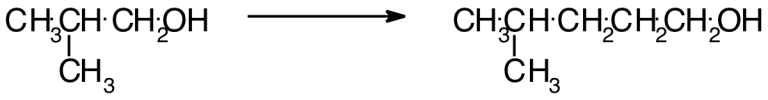
__ C. 1 will undergo dehydration more rapidly than 2 when heated with $H_2SO_4$.

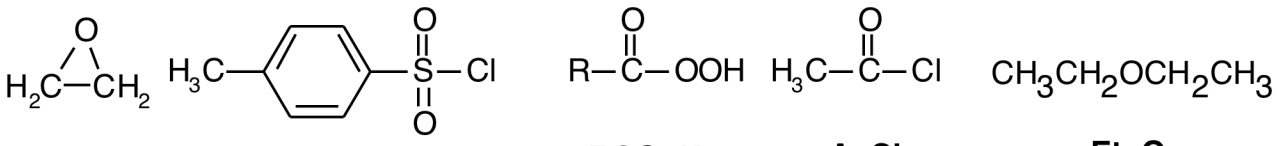
__ D. 3 will undergo dehydration more rapidly than 4 when heated with $H_2SO_4$.

__ E. 7 will undergo dehydration more rapidly than 8 when heated with $H_2SO_4$.

Rationale:
similar to Chapter 10 Problem 34(a-e)

2. Pick the choice which CORRECTLY describes how the following synthesis could be carried out. Note the abbreviations used in the multiple choices for several reagents or solvents whose structures are shown below the synthesis.





**EO** **TsCl** **$RCO_3H$** **AcCl** **$Et_2O$**

__ A. First: TsCl /pyridine; Next: $CH_2$=CHMgBr; Next: $RCO_3H$; Finally: $H^+/H_2O$

__ B. First: TsCl /pyridine; Next: EO; Finally: $HO^-/H_2O$

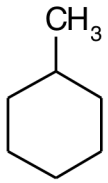
__ C. First: HBr/$\Delta$; Next: Mg/$Et_2O$; Finally: 1. EO, and 2. $H^+$

__ D. First: HBr; Next: Mg/$Et_2O$; Next: AcCl ; Finally: $H_2$/Pd

__ E. First: TsCl /pyridine; Next: $HOCH_2CH_2MgBr$

Rationale:
Chapter 11Problem 25b

3. How many alkyl chlorides can be obtained from monochlorination of the hydrocarbon whose structure is shown below? Disregard stereoisomers.



__ A. 5

__ B. 4

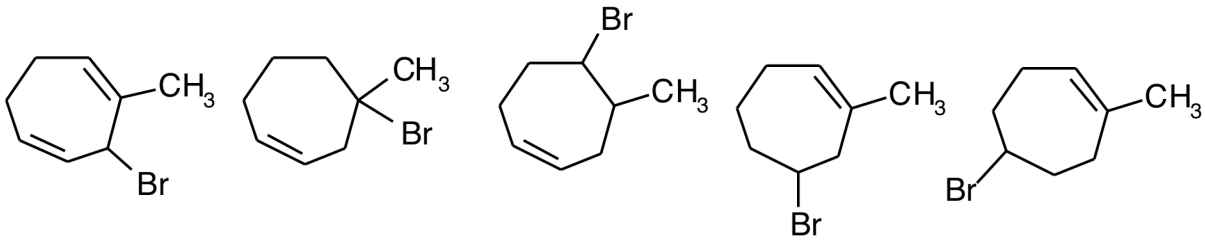
__ C. 3

__ D. 6

__ E. 7

Rationale:
Chapter 12 Problem 4e

4. Choose structure of the major product of the reaction shown below.

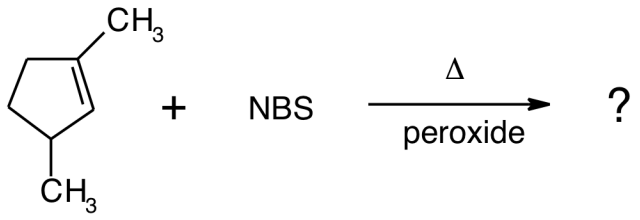



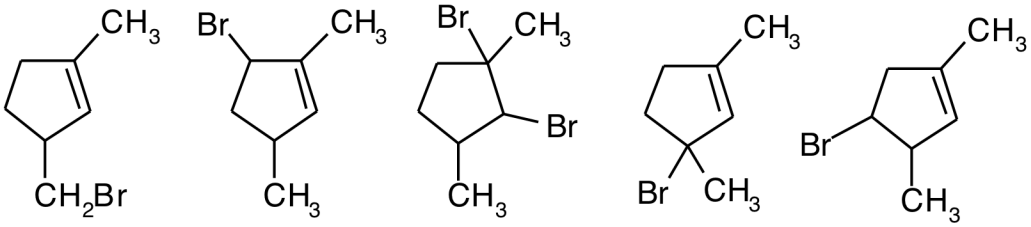

**1** **2** **3** **4** **5**

__ A. 4
__ B. 5
__ C. 2
__ D. 1
__ E. 3

Rationale:
Chapter 12 Problem 32e

5. Choose structure of the major product of the reaction shown below.



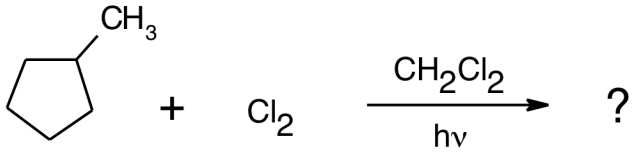



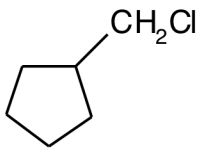

**1** **2** **3** **4** **5**

__ A. 3
__ B. 4
__ C. 1
__ D. 5
__ E. 2

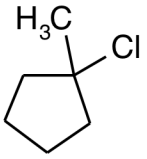
Rationale:
Chapter 12 Problem 26e

6. Choose structure of the product(s) of the reaction shown below.

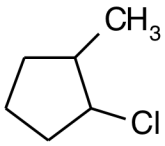


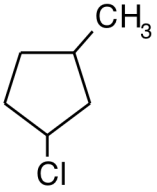

**1**




**2**




**3**




**4**

__ A. This reaction produces only product 3.

__ B. This reaction produces only product 2.

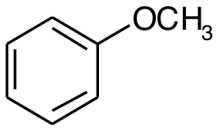
__ C. This reaction produces only product 1.

__ D. This reaction produces only product 4.

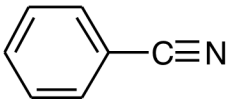
__ E. This reaction produces products 1, 2, 3, and 4.

Rationale:
Chapter 12 Problem 22f

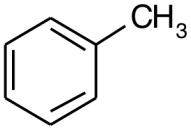
7. Figure out the names of the five compounds whose structures are shown below. Choose the one which is CORRECTLY named in the multiple choices.



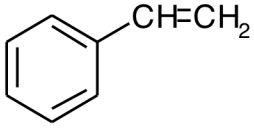

**1**



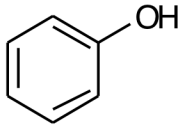

**2**




**3**




**4**




**5**

__ A. Compound 1 is phenol.

__ B. Compound 4 is benzaldehyde.

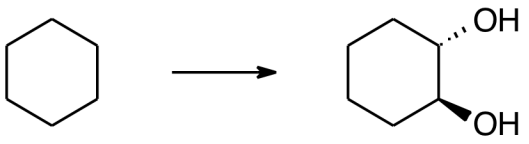
__ C. Compound 2 is benzonitrile.

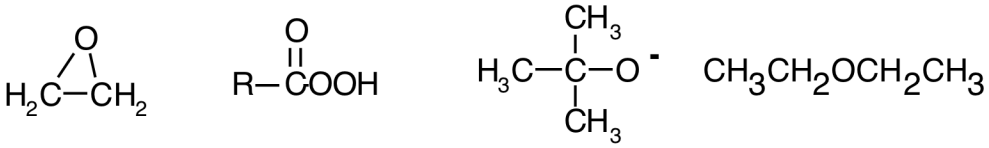
__ D. Compound 5 is toluene.

__ E. Compound 3 is anisole.

Rationale:
Chapter 15 Problem 35

8. Pick the choice which CORRECTLY describes how the following synthesis could be carried out. Note the abbreviations used in the multiple choices for several reagents or solvents whose structures are shown below the synthesis.




**EO** **$RCO_3H$** ***tert*-$BuO^-$** **$Et_2O$**

__ A. First: $Br_2/h\nu$; Next: $Mg/Et_2O$; Next: EO; Finally: $H^+/H_2O$

__ B. First: $Br_2/h\nu$; Next: tert -BuO $^-$; Next: $Br_2/CH_2Cl_2$; Next $NaNH_2$ (excess); Finally: $H^+/H_2O$

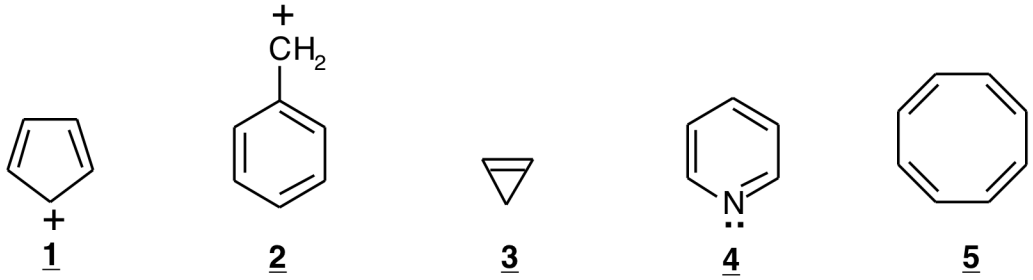
__ C. First: $Br_2/h\nu$; Next: tert -BuO $^-$; Next: $RCO_3H$; Finally: $HO^-$

__ D. First: $Br_2/h\nu$; Next: tert -BuO $^-$; Next: EO; Finally: $HO^-$

__ E. First: $Br_2/h\nu$; Next: $HO^-$; Next: $H_2CrO_4$; Next: $RCO_3H$; Finally: $HO^-$

Rationale:
Chapter 12 Problem 19d

9. Classify each of the five numbered structures below as aromatic, nonaromatic, or antiaromatic. (Hint: If possible a ring will be nonplanar to avoid being antiaromatic.)




**1** **2** **3** **4** **5**

__ A. 2 is nonaromatic.

__ B. 5 is antiaromatic.

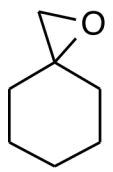
__ C. 4 is nonaromatic.

__ D. 1 is antiaromatic.

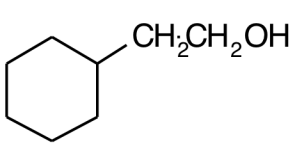
__ E. 3 is aromatic.

Rationale:
Chapter 15 Problem 36

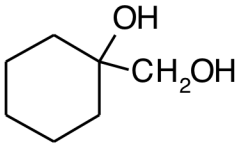
10. By looking at the numbered structures below figure out which of the multiple choices specifies the CORRECT product of a reaction.



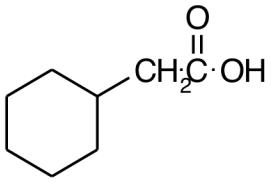

**1**



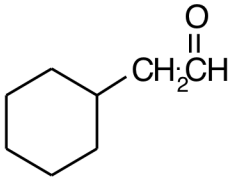

**2**



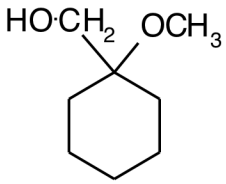

**3**



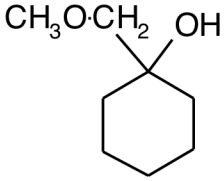

**4**




**5**




**6**




**7**

__ A. 1 + $H^+/CH_3OH \rightarrow$ 2

__ B. 1 + $H^+/CH_3OH \rightarrow$ 7

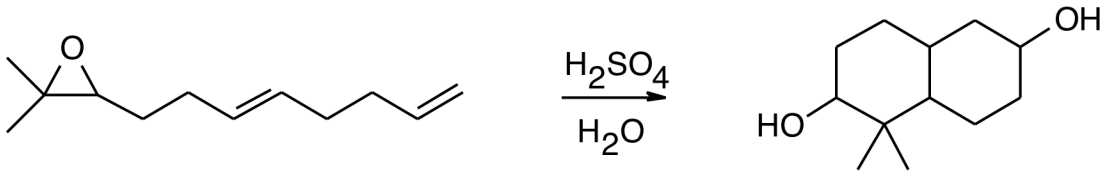
__ C. 1 + $CH_3O^-/CH_3OH \rightarrow$ 6

__ D. 2 + $H_2CrO_4 \rightarrow$ 4

__ E. 2 + $H_2CrO_4 \rightarrow$ 5

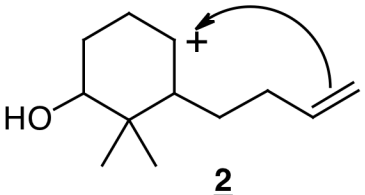
Rationale:
Chapter 10 Problem 38(d,e,f,i)

11. Work out the curved-arrow mechanism for the rearrangement reaction shown below.

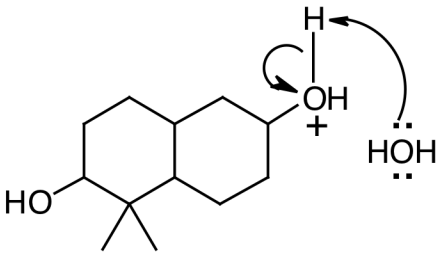



Which of the numbered curved-arrow mechanistic processes shown below is NOT part of your mechanism?

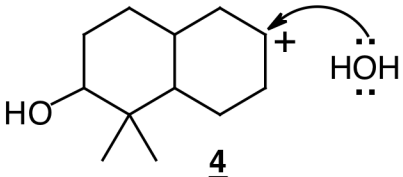

**1**



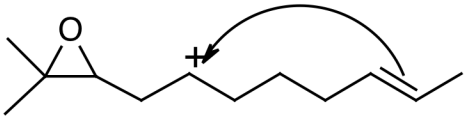

**2**




**3**




**4**




**5**

__ A. 1

__ B. 3

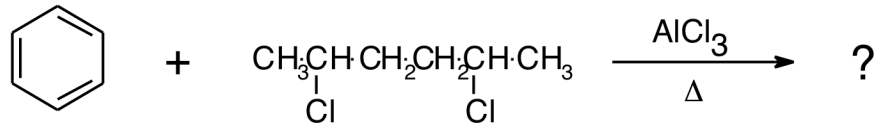
__ C. 4

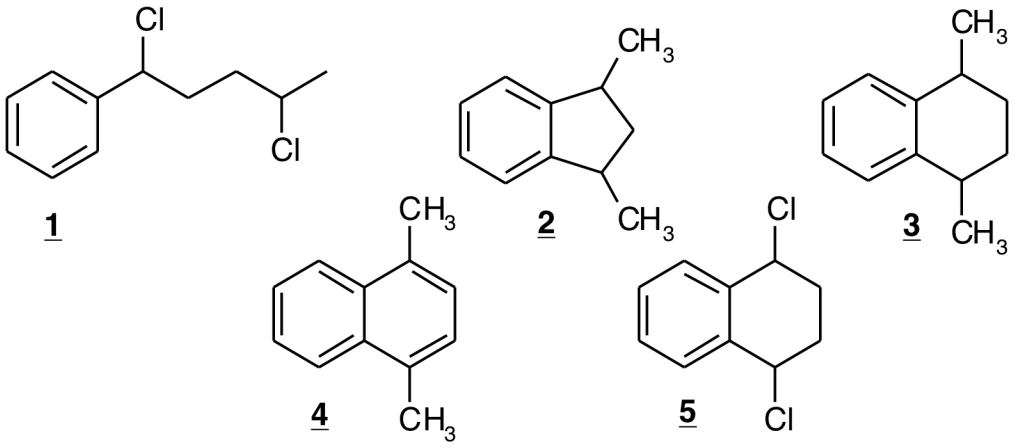
__ D. 2

__ E. 5

Rationale:
Chapter 10 Problem 59a

12. Choose the CORRECT structure of the product of the reaction shown below.




__ A. 4

__ B. 2

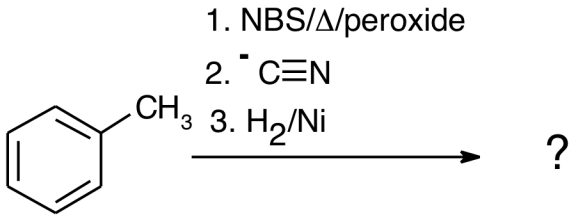
__ C. 3

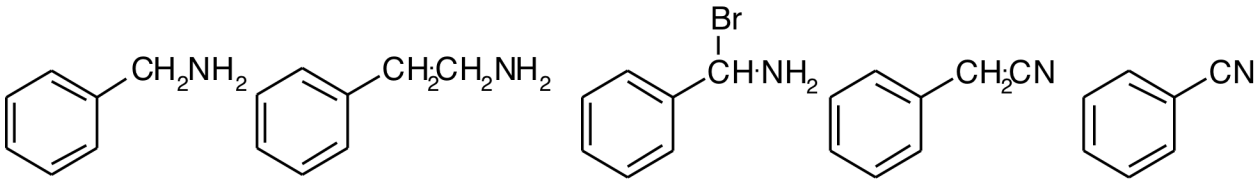
__ D. 1

__ E. 5

Rationale:
moved to Chapter 16

13. Choose number of the CORRECT structure of the product of the following reaction:



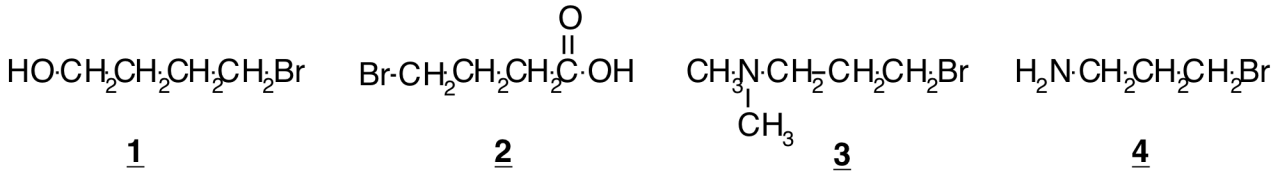




**1** **2** **3** **4** **5**

__ A. 1
__ B. 4
__ C. 5
__ D. 2
__ E. 3

Rationale:
moved to Chapter 16

14. Choose the alkyl halides which could SUCCESSFULLY be used to make Grignard reagents from the numbered structures below.

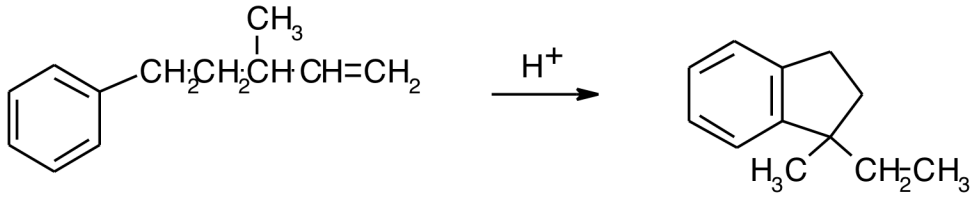


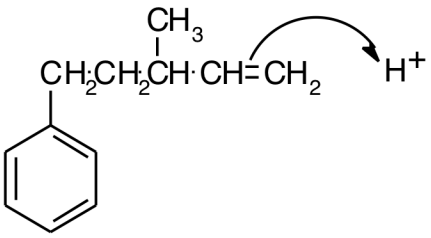

**1** **2** **3** **4**

__ A. The alkyl halides with structures 3 and 4 could be successfully used to make Grignard reagents.
__ B. Only the alkyl halide with structure 3 could be successfully used to make a Grignard reagent.
__ C. All four alkyl halides could be used successfully to make Grignard reagents.
__ D. The alkyl halides with structures 1 and 2 could be successfully used to make Grignard reagents.
__ E. None of the alkyl halides shown could be used successfully to make Grignard reagents.

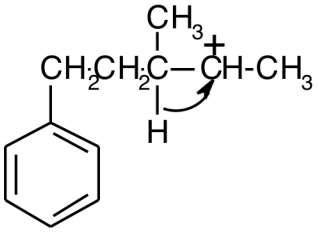
Rationale:
similar to Chapter 11 Problem 23

15. Work out the curved-arrow mechanism for the rearrangement reaction shown below. Which of the numbered curved-arrow mechanistic processes shown below is NOT part of your mechanism?

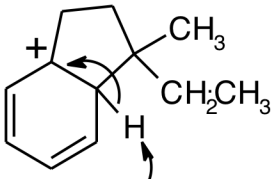




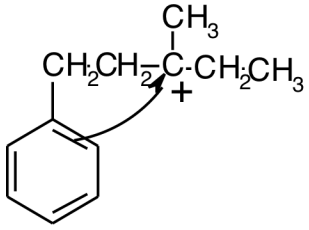
**1**



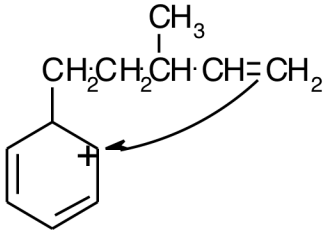
**2**



**3**



**4**



**5**

__ A. 4

__ B. 3

__ C. 1

__ D. 5

__ E. 2

Rationale:
Chapter 15 Problem 47a

Answer Key

# "Grade or Education" = 1

**CHEM 2261/01**
**Summer 08**
**Exam 4**
**Chapters 10, 11, 14**

1. B
2. C
3. A
4. E
5. B
6. E
7. C
8. C
9. D
10. D
11. E
12. C
13. D
14. B
15. D