

國立臺北科技大學

九十四學年度生物科技研究所入學考試

有機化學試題

填准考證號碼

第一頁 共四頁

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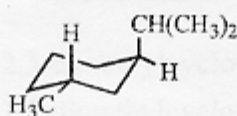
注意事項：

1. 本試題共 3 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

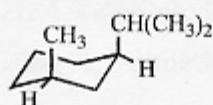
I. Please select the best answer for each of following questions (30 points; 2 points each)

1. Which would be the **most stable** conformation of *trans*-1-methyl-3-isopropylcyclohexane?

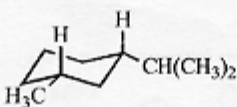
A).



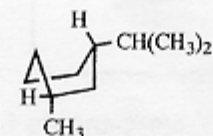
B).



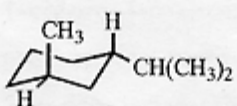
C).



D).



E).

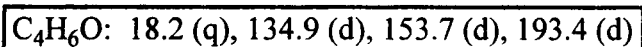


2. What would be the name of the following?



- A). 3,4-dibromo-2-methylhexane
- B). 1,2-dibromo-1-isopropylbutane
- C). 2,3-dibromohexane
- D). 3,4-dibromo-5-methylhexane
- E). 3,4-dibromo-3-methylhexane

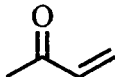
3. The molecular formulas and ^{13}C NMR data (in ppm) are given below. The splitting pattern of each signal, taken from the **non-decoupled** spectrum is given in parentheses. Deduce the correct structure:



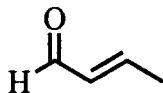
A).



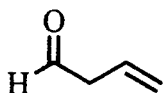
B).



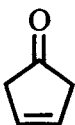
C).



D).

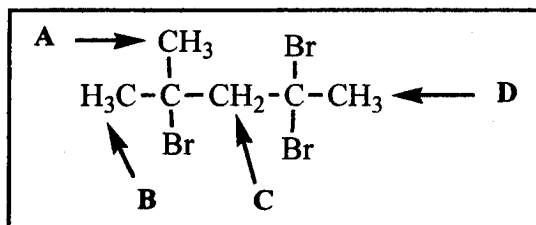


E).

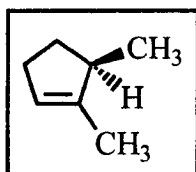


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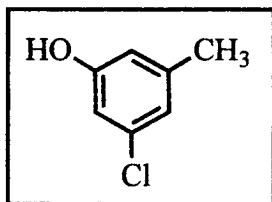
4. The most downfield proton NMR signal (i.e., signal most to the left in the spectrum) in the following molecule would be



- A) A
 B) B
 C) C
 D) D
 E) there is no way to tell.
5. What would be the name of the following compound?



- A) 2,3-dimethylcyclopentene
 B) 1,5-dimethylcyclopentene
 C) *cis*-2,3-dimethylcyclopentene
 D) *cis*-1,5-dimethylcyclopentene
 E) *trans*-2,3-dimethylcyclopentene
6. How would you name the following?

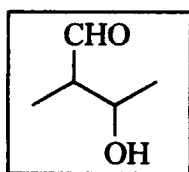


- A) 3-chloro-5-methylphenol
 B) 3-hydroxy-5-chlorotoluene
 C) 1-chloro-3-hydroxy-5-methylbenzene
 D) *meta*-methy-*meta*-hydroxytoluene
 E) 3-hydroxy-5-methylchlorobenzene

7. Infrared spectroscopy is a useful technique in identifying terminal alkynes. What is/are the characteristic stretching band(s) for a terminal alkyne?

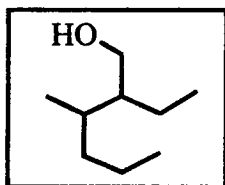
- A) $3260-3330\text{ cm}^{-1}$
- B) $1550-1680\text{ cm}^{-1}$
- C) $2100-2260\text{ cm}^{-1}$
- D) Both A and B
- E) Both A and C

8. What would be the proper name of the following molecule?



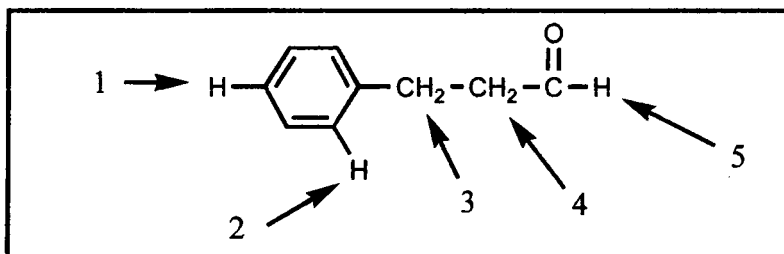
- A) 3-formyl-2-butanol
- B) 2-(hydroxyethyl)propanal
- C) 3-hydroxy-2-methylbutanal
- D) 2,3-dimethylpropan-3-ol-1-al
- E) 1-methyl-3-formyl-1-propanol

9. What would be the name of the following compound?



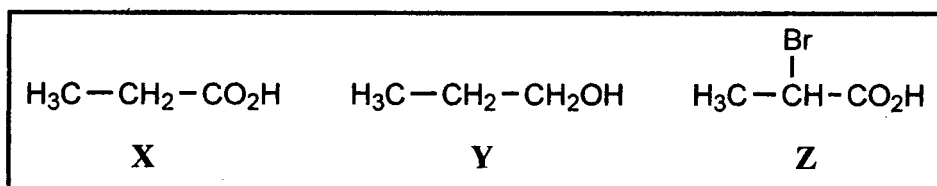
- A) 3-hydroxymethyl-4-methylheptane
- B) 2-*sec*-butyl-1-butanol
- C) 2-ethyl-3-methyl-1-hexanol
- D) 2-ethyl-3-propyl-1-butanol
- E) 2-(*sec*-pentyl)-1-butanol

10. Which proton in the following molecule is the most acidic?



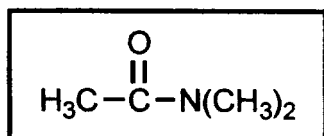
- A) 1
- B) 2
- C) 3
- D) 4
- E) 5

11. Rank the following in **decreasing** order of acidity (most acidic on left):



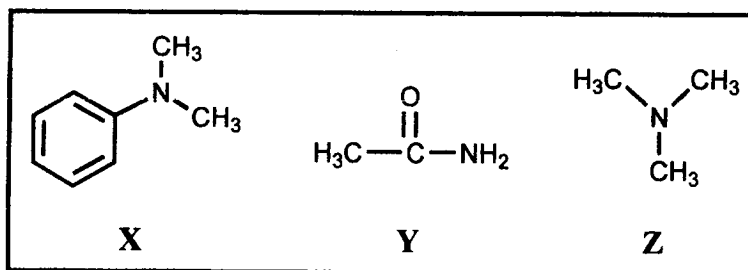
- A) $\text{X} > \text{Z} > \text{Y}$
- B) $\text{Y} > \text{X} > \text{Z}$
- C) $\text{Z} > \text{X} > \text{Y}$
- D) $\text{Z} > \text{Y} > \text{X}$
- E) $\text{X} > \text{Y} > \text{Z}$

12. How many different CH_3 signals would you expect in the room-temperature proton NMR spectrum of the molecule below?



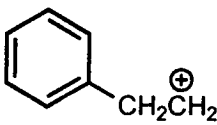
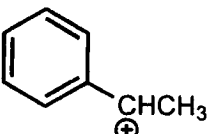
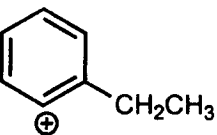
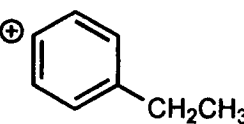
- A) one
- B) two
- C) three
- D) four
- E) five

13. Rank the following in order of **decreasing** basicity (most basic on left):



- A) $Z > X > Y$
- B) $Y > X > Z$
- C) $Z > Y > X$
- D) $X > Z > Y$
- E) $X > Y > Z$

14. Which ion would be **most** stabilized by resonance?

- A) 
- B) 
- C) 
- D) 
- E) All are equally stabilized

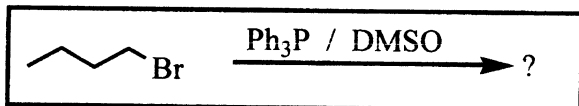
15. The Dieckmann reaction is best described by which of the following statements?

- A) Intermolecular Aldol Condensation
- B) Intramolecular Aldol Condensation
- C) Intermolecular Claisen Condensation
- D) Intramolecular Claisen Condensation
- E) Michael Addition followed by intramolecular Aldol

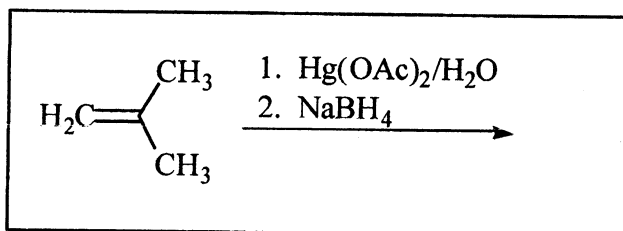
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II. What is the major product of the following reactions (40 points; 8 points each)

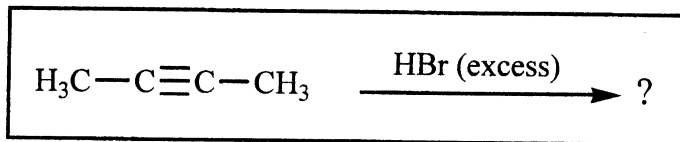
1



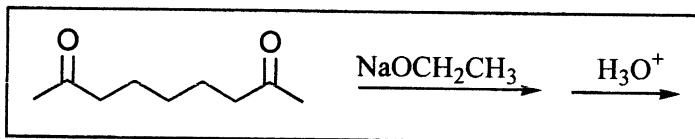
2



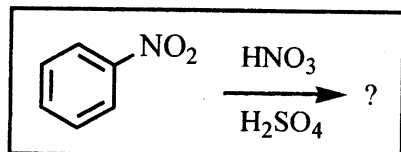
3



4.

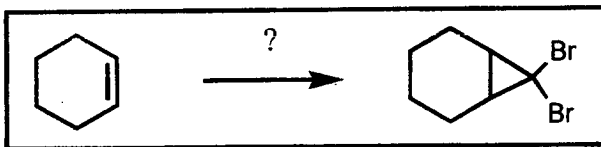


5.

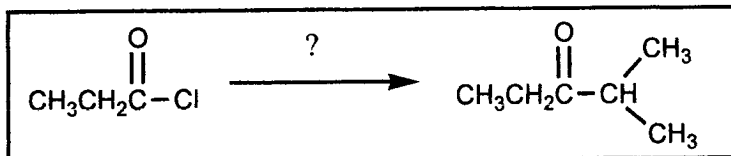


III. Please provide the reagents for the following reactions (30 points 5 points each)

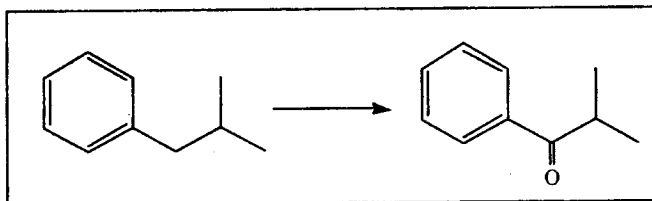
1.



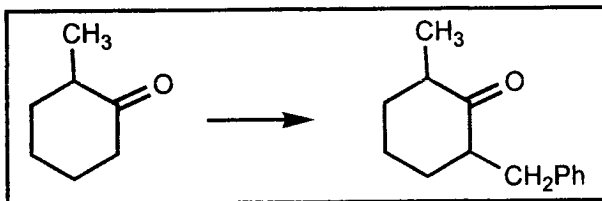
2.



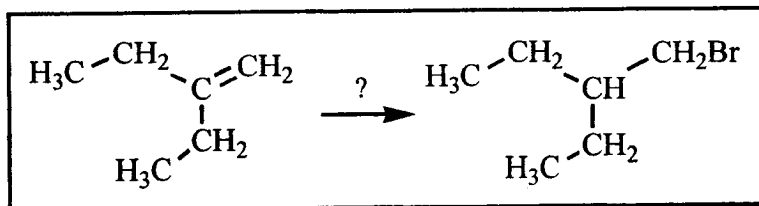
3.



4.



5.



6.

