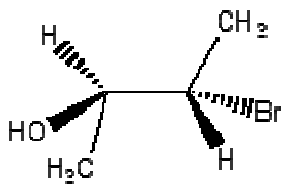
臺北醫學大學 103 學年度碩士班暨碩士在職專班招生入學考試

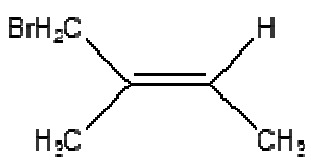
注意事項	一、本試題共 30 題，共計 100 分。 二、請將最適當的答案依題號作答於答案卷上。 三、試題答錯者不倒扣；題次號碼錯誤或不按順序或鉛筆作答，不予計分。

I. Give the IUPAC names of the following two compounds, if possible with proper R/S or E/Z designations. (8%, 4% each)

1.

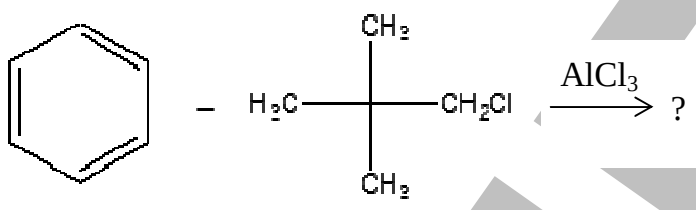


2.

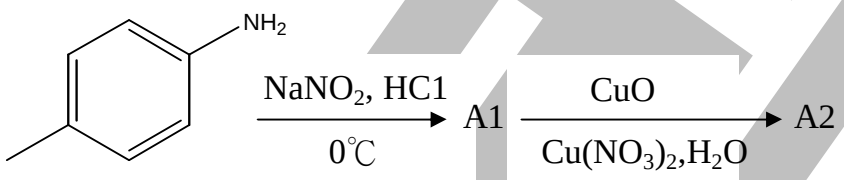


II. Give the products of the following reactions. (8%, 4% each)

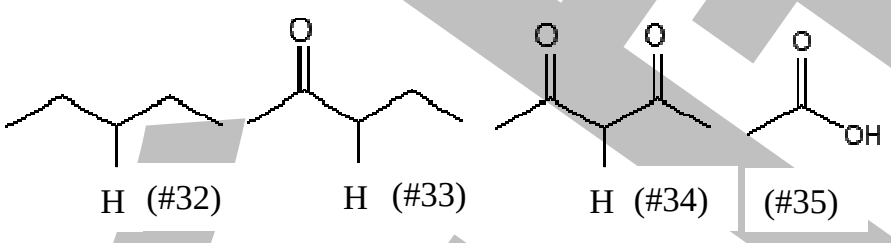
3.

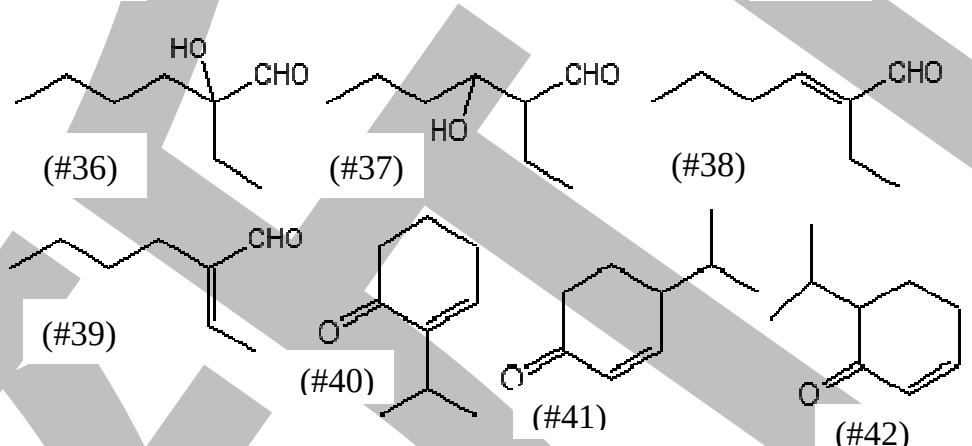


4. What are the compound of A1 and A2? Give their structures.



III. The following items will be used to answer the questions 5-7. (9%, 3% each)



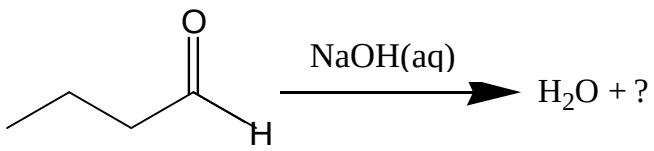


5. For the compounds (#32)~(#35), what is the order of their acidity?

Ⓐ (#35) < (#34) < (#33) < (#32)　　Ⓑ (#32) < (#34) < (#33) < (#35)

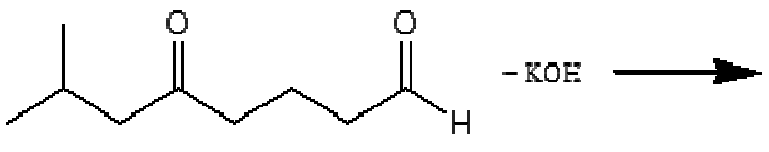
Ⓒ (#32) < (#33) < (#34) < (#35)　　Ⓓ (#32) < (#35) < (#33) < (#34)

6. The product of the following reaction is ?



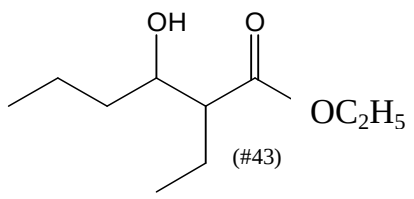
Ⓐ (#36)　　Ⓑ (#37)　　Ⓒ (#38)　　Ⓓ (#39)

7. The **dehydration** product of the following reactions is ?

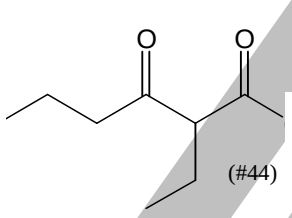


Ⓐ (#39)　　Ⓑ (#40)　　Ⓒ (#41)　　Ⓓ (#42)

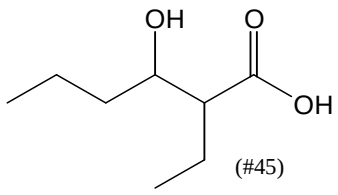
IV. The following items will be used to answer the questions 8-9. (6%, 3% each)



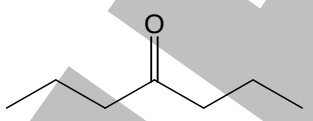
(#43)



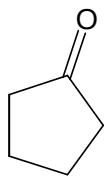
(#44)



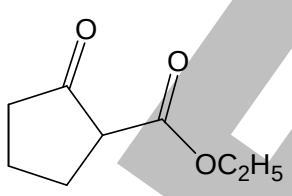
(#45)



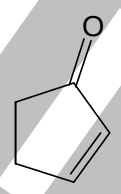
(#46)



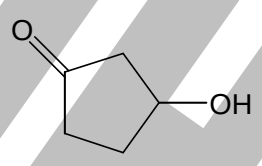
(#47)



(#48)

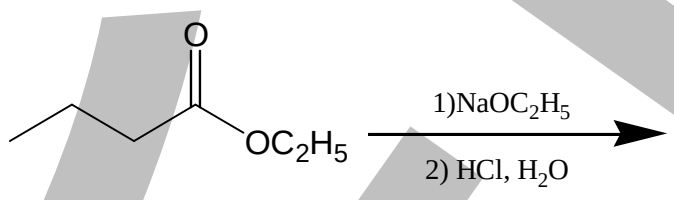


(#49)



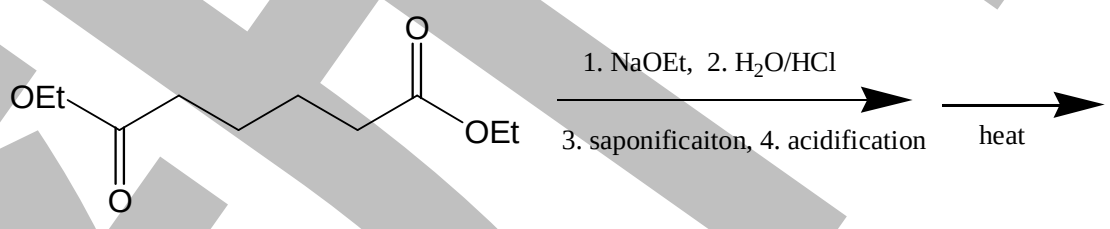
(#50)

8. The product of the following reaction is ?



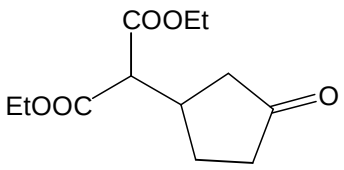
Ⓐ (#43)　　Ⓑ (#44)　　Ⓒ (#45)　　Ⓓ (#46)

9. The product of the following reaction is?

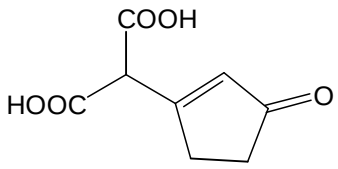


Ⓐ (#47)　　Ⓑ (#48)　　Ⓒ (#49)　　Ⓓ (#50)

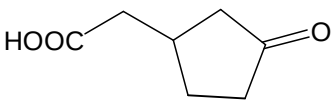
V. The following items will be used to answer the question 10.



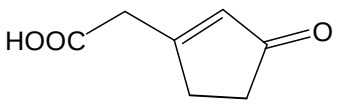
(#51)



(#52)

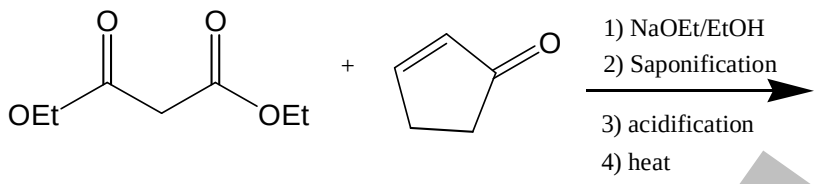


(#53)



(#54)

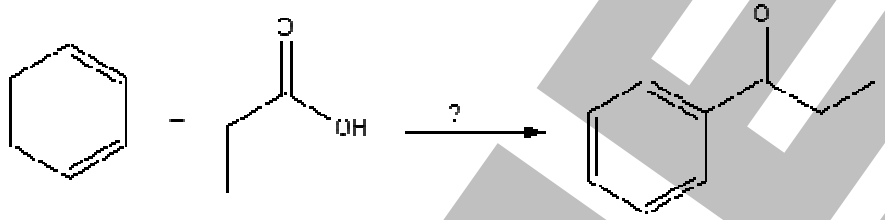
10. The product of the following reaction is ? (3%)



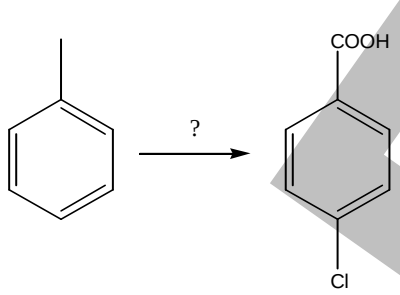
Ⓐ (#51)　Ⓑ (#52)　Ⓒ (#53)　Ⓓ (#54)

VI. Show the reagents and conditions to complete the following synthesis. (11-12) . (8%, 4% each)

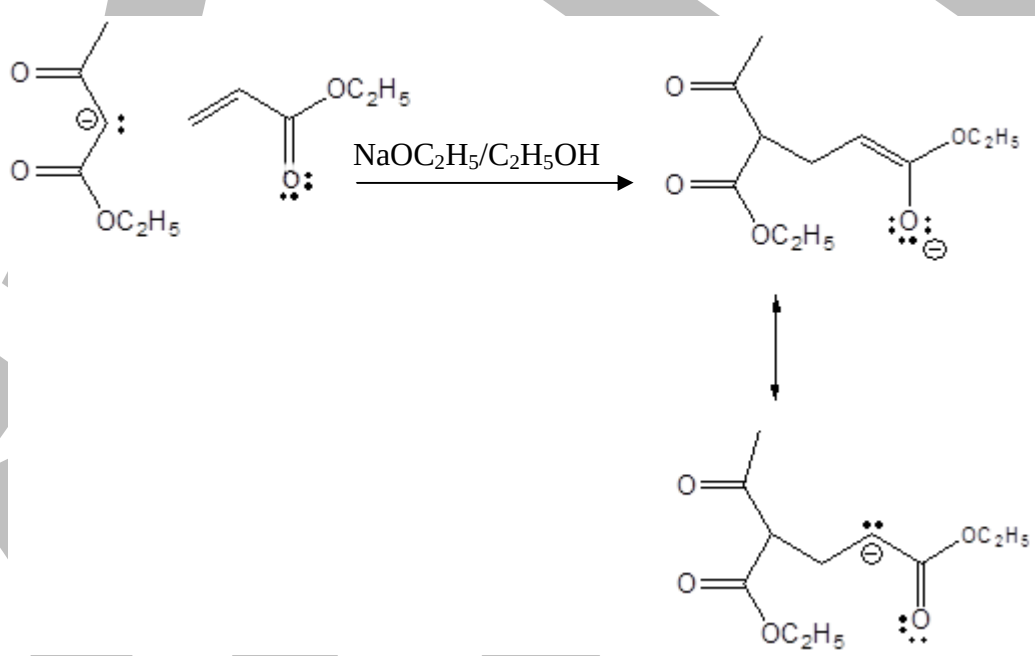
11.



12.

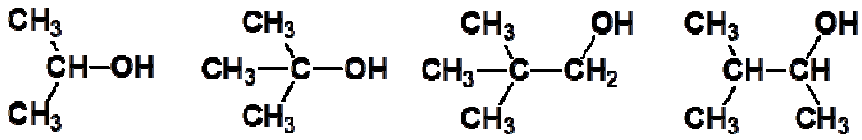


13. Please draw curved arrows to complete the following conversions: (4%)



VII. Multiple choice. (42%, 3% each)

14. Which of the following compounds is a tertiary (3°) alcohol?



I　　II　　III　　IV

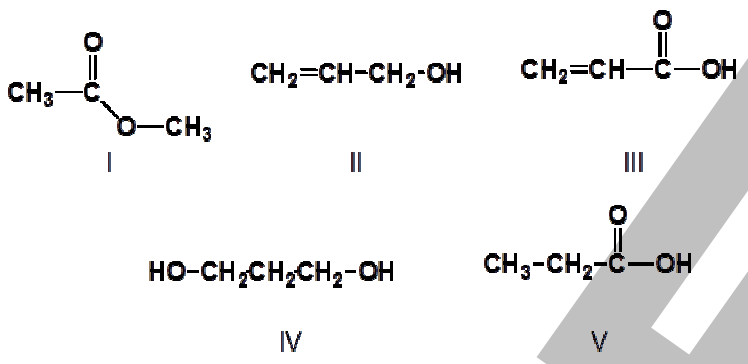
Ⓐ I　　Ⓑ II　　Ⓒ III　　Ⓓ IV

15. Arrange the following species in the order of increasing acidity (weakest to strongest).

I. H_2O　　II. H_3O^+　　III. NH_4^+

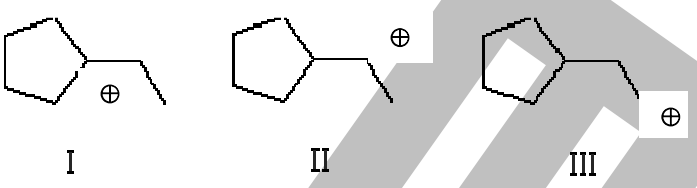
Ⓐ II, III, I　　Ⓑ I, II, III　　Ⓒ III, II, I　　Ⓓ I, III, II

16. Which of the following belong in the group of constitutional isomers for $C_3H_6O_2$?



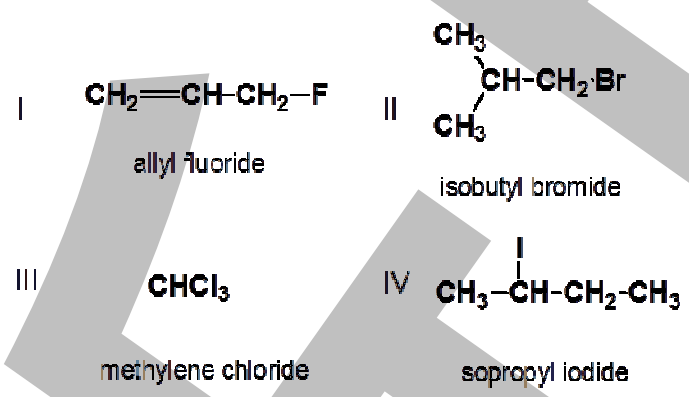
Ⓐ II, III　　Ⓑ II, IV, V　　Ⓒ I, II, V　　Ⓓ I, V

17. Arrange these carbocations in order of increasing stability (least to most).



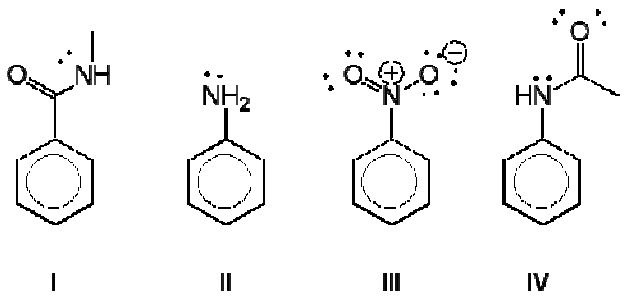
Ⓐ I, II, III　　Ⓑ I, III, II　　Ⓒ II, I, III　　Ⓓ III, II, I

18. Which of the following structures have correct common names?



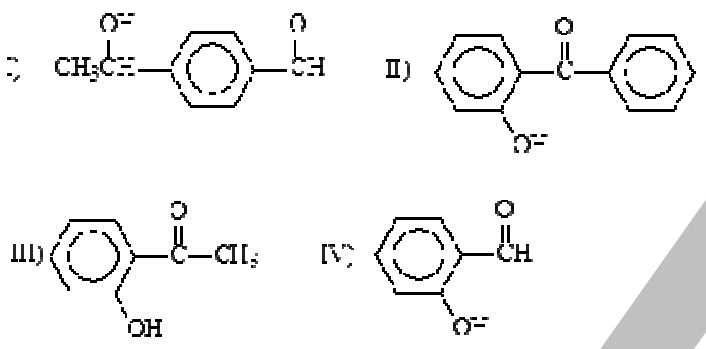
Ⓐ I, III　　Ⓑ III, IV　　Ⓒ I, II　　Ⓓ II, IV

19. Arrange the compounds in order of increasing reactivity toward electrophilic aromatic substitution (lowest first).



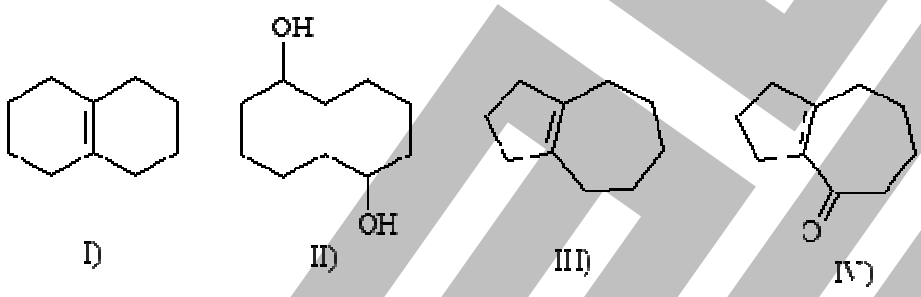
Ⓐ IV < II < I < III　　Ⓑ I < III < II < IV　　Ⓒ II < I < IV < III　　Ⓓ III < I < IV < II

20. Which is the correct structure for 2-hydroxybenzophenone?



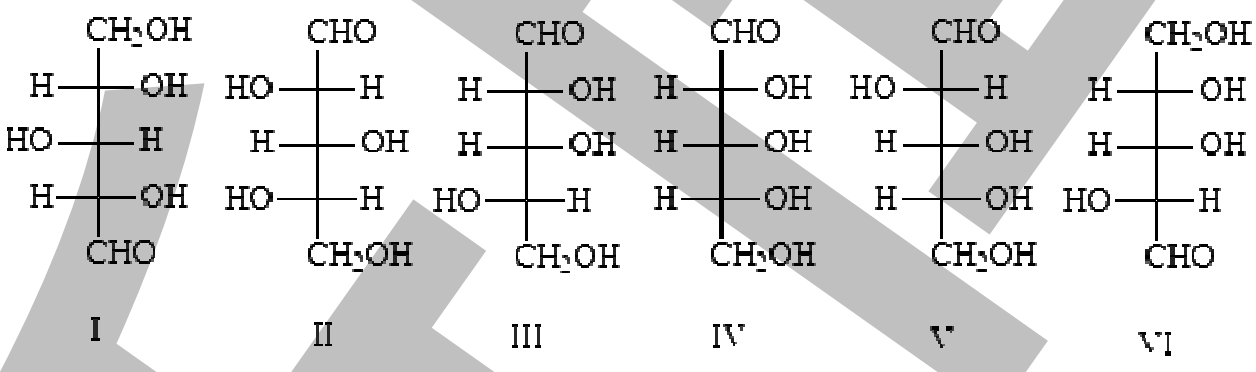
Ⓐ I　　Ⓑ II　　Ⓒ III　　Ⓓ IV

21. Which is the major product from the reaction of 1,6-cyclodecanedione with hot aqueous NaOH?



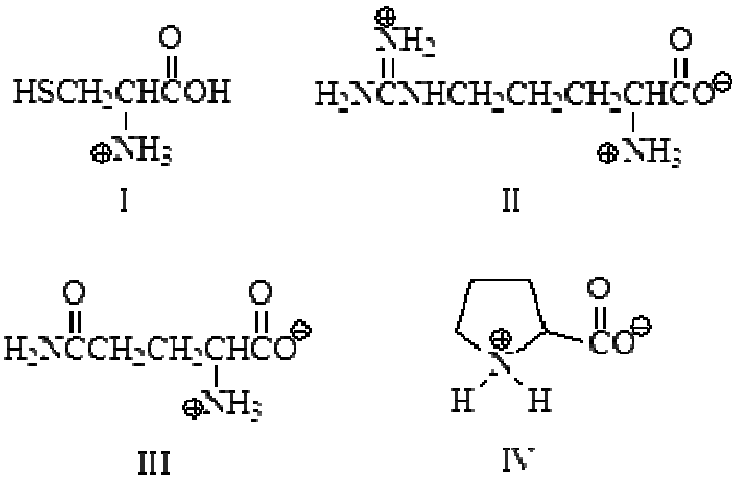
Ⓐ I　　Ⓑ II　　Ⓒ III　　Ⓓ IV

22. Which monosaccharides have the *D* configuration?



Ⓐ I, IV, V　　Ⓑ IV, V　　Ⓒ II, III, VI　　Ⓓ IV, VI

23. Which molecules are zwitterions?



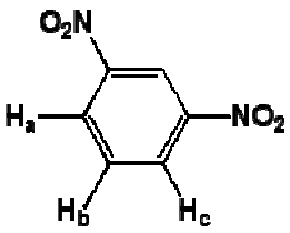
Ⓐ I, III　Ⓑ II, III　Ⓒ III, IV　Ⓓ I, IV

24. Fats, oils, phospholipids, prostaglandins and steroids have which properties in common?

I) oxygen functionality
II) nonpolar groups
III) rings
IV) unsaturation

Ⓐ III, IV　Ⓑ I, II　Ⓒ I, III　Ⓓ II, IV

25. Which splitting pattern (H_a:H_b:H_c) is observed ?

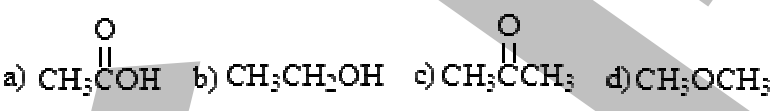


Ⓐ doublet:triplet:doublet　Ⓑ singlet:doublet:singlet　Ⓒ singlet:triplet:singlet　Ⓓ doublet:sixtet:doublet

26. Which is the index of hydrogen deficiency for a compound having molecular formula $C_7H_5Cl_2NO$?

Ⓐ 4　Ⓑ 5　Ⓒ 6　Ⓓ 7

27. Which compound has an IR absorption at 3300 cm^{-1} but no band at 1710 cm^{-1}?

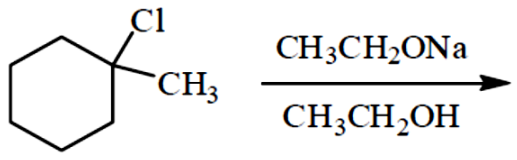


Ⓐ a　Ⓑ b　Ⓒ c　Ⓓ d

VIII. Answer the following questions. (12%, 4% each)

28. Draw the chemical structure of 4,6-diisopropyl-2-methylnonane.

29. Predict the β-elimination product formed when each chloroalkane is treated with sodium ethoxide in ethanol.



30. Following figure is a ^{1}H-NMR spectrum for a compound that is a colorless liquid with the molecular formula $C_7H_{14}O$. Propose a structural formula for the compound.