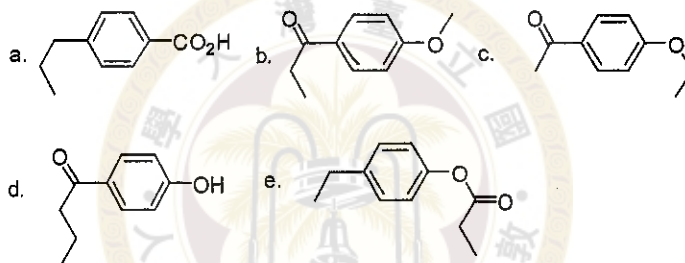


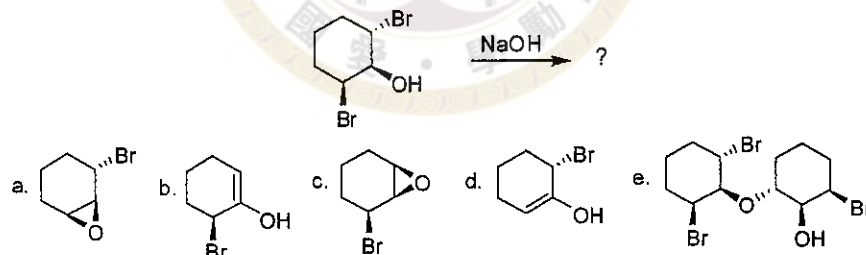
※ 注意：請於答案卷內之「選擇題作答區」依序作答。

- Which of the following statements is false?
 - 4-Nitrophenol ($4\text{-NO}_2\text{-C}_6\text{H}_4\text{-OH}$) is more acidic than 3-nitrophenol ($3\text{-NO}_2\text{-C}_6\text{H}_4\text{-OH}$)
 - Sulfonation of nitrobenzene is slower than sulfonation of benzoic acid
 - The reaction of chlorobenzene with NaOH is faster than that of chlorocyclohexane under the same condition
 - Phenylacetic acid ($\text{C}_6\text{H}_5\text{CH}_2\text{CO}_2\text{H}$) is a stronger acid than benzoic acid ($\text{C}_6\text{H}_5\text{CO}_2\text{H}$)
 - Phenol undergoes Friedel-Crafts alkylation faster than toluene

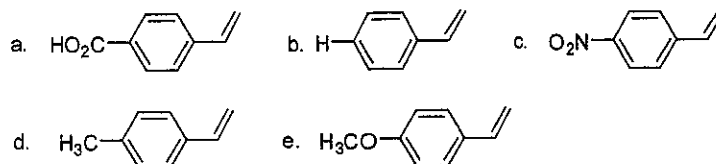
- A compound $\text{C}_7\text{H}_8\text{O}$ can be made to undergo Friedel-Crafts acylation to give a compound $\text{C}_{10}\text{H}_{12}\text{O}_2$. The NMR spectrum of this latter compound consists of a pair of doublets at 7.0 and 8.0 ppm (total of 4 H), a singlet at 3.9 ppm (3 H), a quartet at 2.9 ppm (2 H), and a triplet at 1.2 ppm (3 H). The compound $\text{C}_{10}\text{H}_{12}\text{O}_2$ is:



- The product of the following reaction will be?



- Which of the following compounds exhibits the fastest rate for the electrophilic bromination of Br_2 to give 4-substituted styrenes.



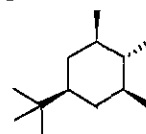
- Which of the following contains a sp^2 -hybridized carbon?

- a. methyl anion b. methyl radical c. methyl cation d. both b and c e. none of them

見背面

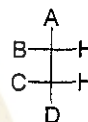
6. About the reaction of 2-methyl-2-butene and HBr, which is true in the following descriptions?
- The 2-methyl-2-butene acts like a Lewis acid
 - The reaction will be more slower when it goes through a tertiary intermediate
 - The major product comes from a primary carbocation
 - The ratio of products will depend on the relative stabilities of carbocation intermediates.
 - This reaction will give an optically active product.

7. For the most stable chair conformer of the following compound, how many methyl group(s) will occupy the axial position?
- a. 0 b. 1 c. 2 d. 3 e. 4

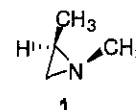


8. If the Fischer projection below is to represent (2R,3S)-2,3-dibromopentane, the identities of A-D must be as follows:

- A = Br, B = Et, C = Br, D = CH₃
- A = Et, B = Br, C = CH₃, D = Br
- A = CH₃, B = Et, C = Br, D = Br
- A = Br, B = CH₃, C = Br, D = Et
- A = CH₃, B = Br, C = Br, D = Et

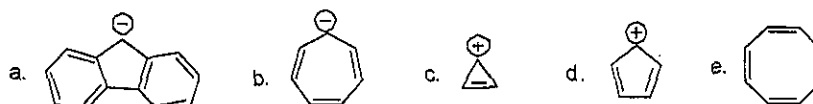


9. Which is false in the following statements?
- Consider the amine inversion, the nitrogen will be sp² hybridized in the transition state
 - There will be an enantiomer for 1,2-dimethylaziridine 1.
 - The absolute configuration of nitrogen in compound 1 is R.
 - There is no amine inversion for compound 1.
 - The absolute configuration of carbon stereocenter in compound 1 is S

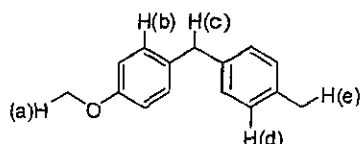


10. In the presence of peroxide, about the reaction of 1-methylcyclohexene and HBr, which is true of the following statements?
- The major product is formed follows the Markovnikov's rule
 - The product is optically active
 - The reaction has an sp² hybridized intermediate
 - The reaction goes through a carbocation intermediate
 - The stability of carbocation will determine the regioselectivity

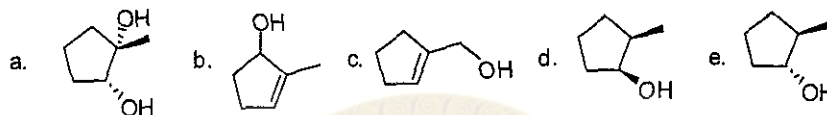
11. Which is aromatic of the following species?



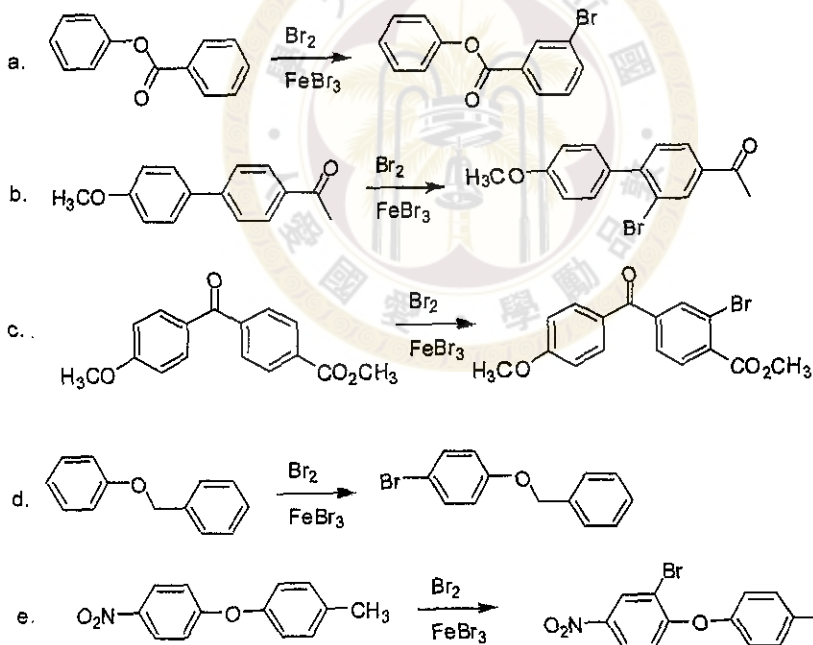
12. Which of the hydrogen a-e in the following structure is most easily abstracted by a bromine radical?



13. Which will be the product of the reaction of 1-methylcyclopentene with BH_3 and followed by $NaOH/H_2O_2$?

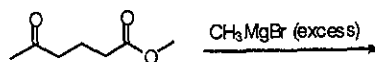


14. Which of the following reaction gives the indicated product as the major product?



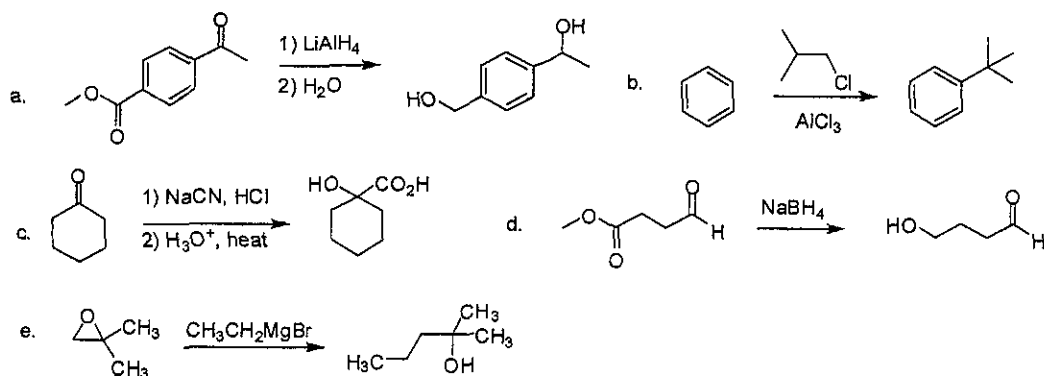
15. How many types of proton signal would the product of the following reaction will show in 1H -NMR?

- a. 2, b. 3, c. 4, d. 5, e. 6

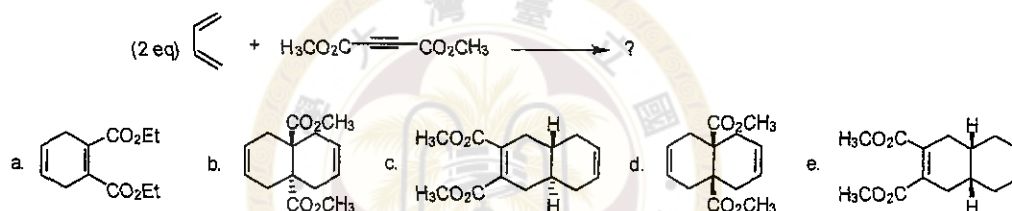


見背面

16. Which of the following reaction **will not** give the indicated product as the major product?



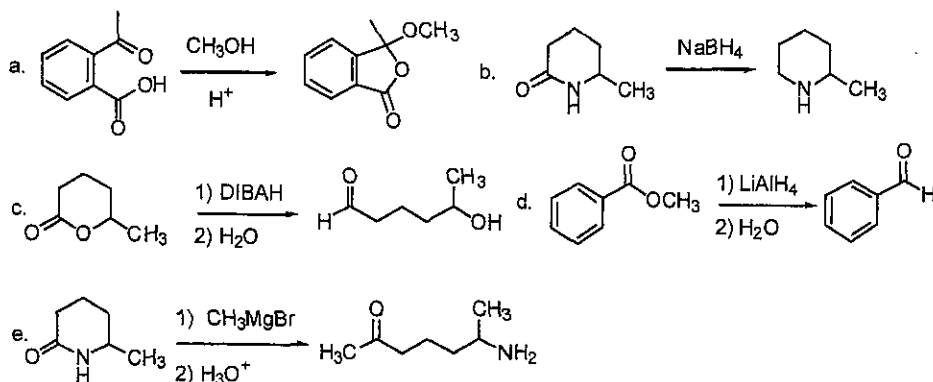
17. Which is the major product in the following Diels-Alder reaction?



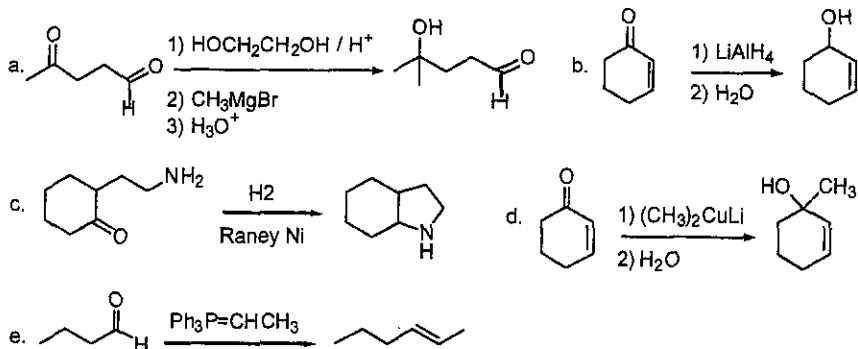
18. For a thermodynamic control reaction, which is false in the following statements?

- The whole reaction is in an equilibrium
- The major product will be the product that is much stable
- The major product will be the product formed faster
- There will be a common intermediate.
- The product distribution will depend on the reaction condition used.

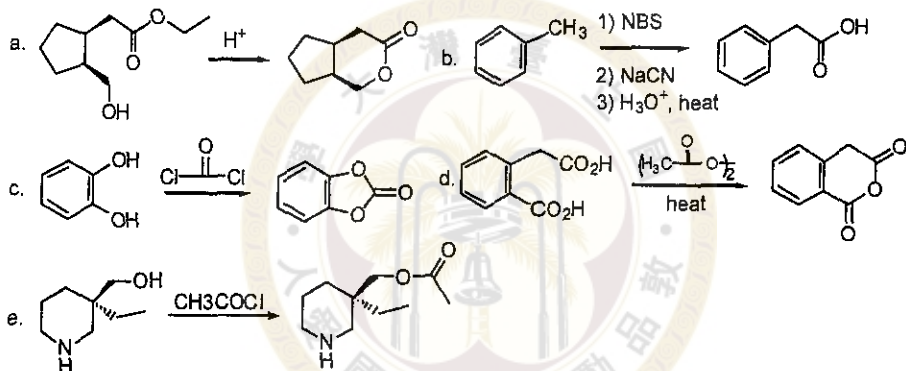
19. Which of the following reaction gives the indicated product as the major product?



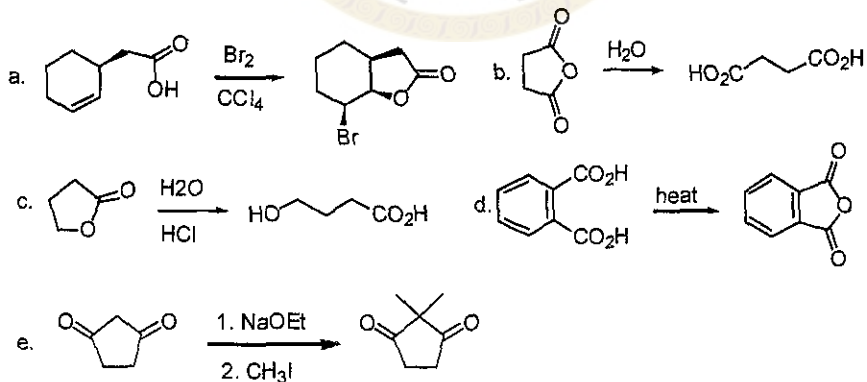
20. Which of the following reaction will not give the indicated product as the major product?



21. Which of the following reaction will not give the indicated product as the major product?

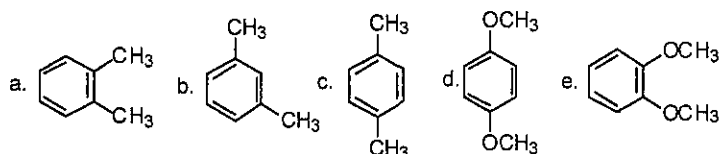


22. Which of the following reaction will not give the indicated product as the major product?

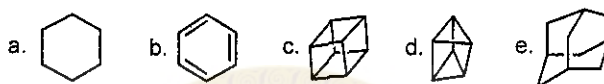


見背面

23. Compound X exhibits 2 singlets at δ 2.5 and 7.1 in the $^1\text{H-NMR}$ spectrum. Compound X is:



24. Which of the following compounds show more than one absorption in $^{13}\text{C-NMR}$ spectrum?



25. Which of the following statements is wrong?

- The rate for bromination of benzene is faster than that for bromination of chlorobenzene
- Phenylacetic acid ($\text{C}_6\text{H}_5\text{CH}_2\text{CO}_2\text{H}$) is a weaker acid than benzoic acid ($\text{C}_6\text{H}_5\text{CO}_2\text{H}$)
- Sulfonation of nitrobenzene is slower than sulfonation of benzoic acid
- 4-Nitrophenol ($4\text{-NO}_2\text{-C}_6\text{H}_4\text{-OH}$) is more acidic than 3-nitrophenol ($3\text{-NO}_2\text{-C}_6\text{H}_4\text{-OH}$)
- The reaction of chlorobenzene with NaOH is faster than that of chlorocyclohexane under the same condition

試題隨卷繳回