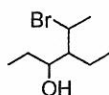


Part I. 單選題. Please select the most appropriate answer for the following questions.

請於試卷內之「選擇題作答區」依序作答。(每題3分,共78分)

1. What is the correct name of the following compound?

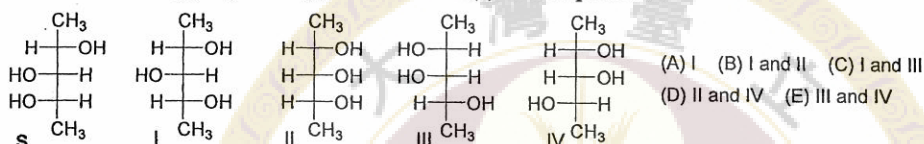


- (A) 4-ethyl-5-bromo-3-hexanol (C) 4-(1-bromoethyl)-3-hexanol (E) None of above
 (B) 4-ethyl-3-bromo-5-hexanol (D) 5-bromo-4-ethyl-3-hexanol

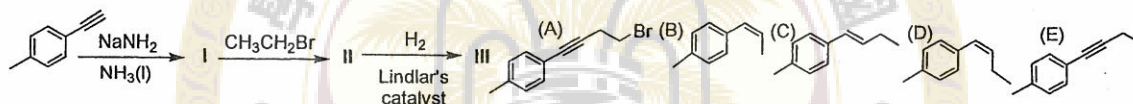
2. Which cycloalkane has the lowest heat of combustion per CH₂ group?



3. Which structure(s) represent(s) diastereomer(s) of compound S?



4. The structure of the product, III, of the following sequence of reactions would be:



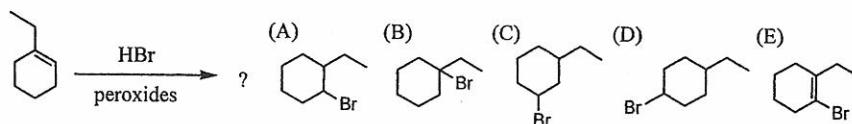
5. Zaitsev's (or Saytzeff's or Saytsev's) rule states that:

- (A) In electrophilic addition of an unsymmetrical reagent to an unsymmetrical alkene, the more positive portion of the reagent will become attached to the carbon of the double bond bearing the greater number of hydrogen atoms. (B) An equatorial substituent in cyclohexane results in a more stable conformation than if that substituent were axial. (C) E2 reactions occur only if the β -hydrogen and leaving group can assume an anti-periplanar arrangement. (D) When a reaction forms an alkene, and several possibilities exist, the more (or most) stable isomer is the one which predominates. (E) The order of reactivity of alcohols in dehydration reactions is $3^\circ > 2^\circ > 1^\circ$.

6. Which reaction of an alkene proceeds with *anti* addition?

- (A) Hydroboration (BH₃) (B) Bromination (Br₂) (C) Oxidation (KMnO₄) (D) Hydrogenation (H₂)
 (E) Oxymercuration (Hg(OAc)₂)

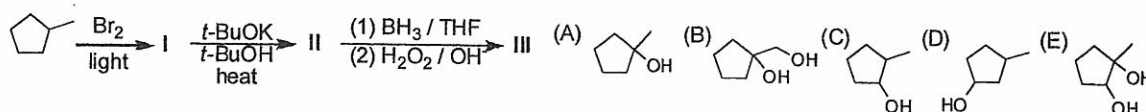
7. What would be the major product of the following reaction?



8. Free radicals can be produced by:

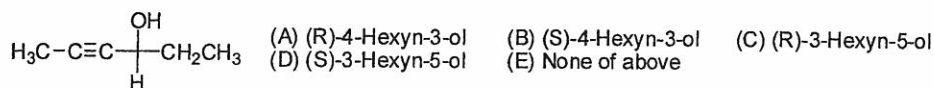
- (A) heating at high temperatures. (B) irradiation with light. (C) reaction of a molecule with another free radical. (D) both (A) and (B). (E) all of (A), (B) and (C).

9. What is the final product, III, obtained via the following reaction sequence?

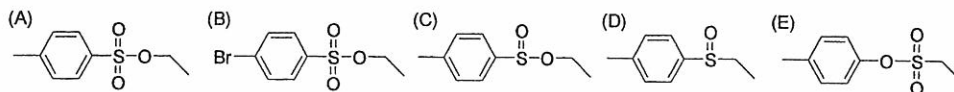


見背面

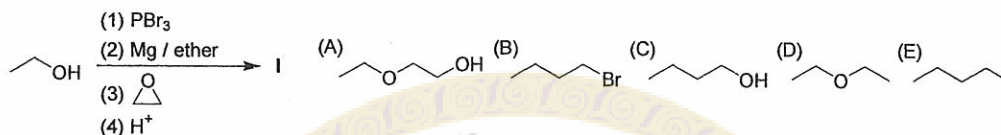
10. A correct name for the following Fischer projection formula is:



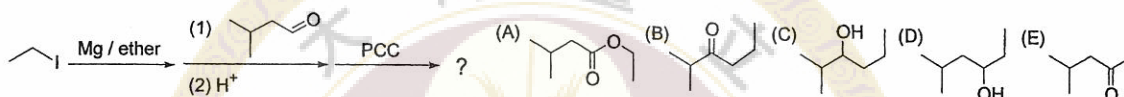
11. Which of the following compound is a tosylate?



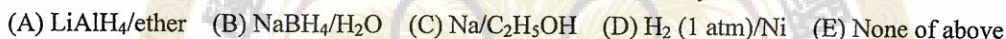
12. The final product, I, in the following reaction sequence, would be:



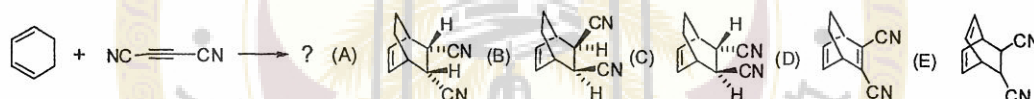
13. What is the final product of the following reaction sequence?



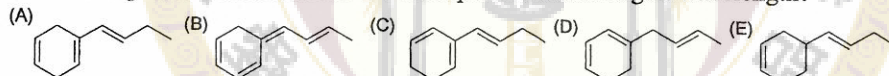
14. Which reagent(s) can efficiently reducing ethyl acetate to an aldehyde?



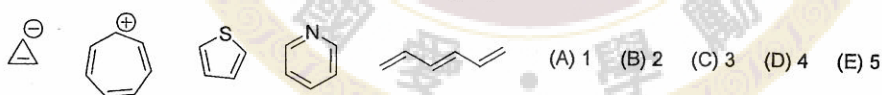
15. Which is the major product of the following reaction?



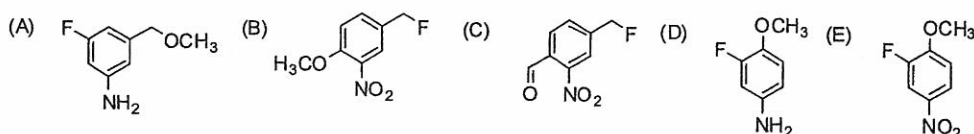
16. Which compound would have an UV absorption band at longest wavelength?



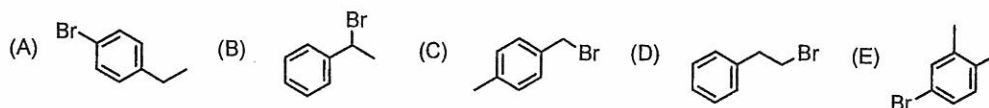
17. How many of the following compounds is(are) aromatic?



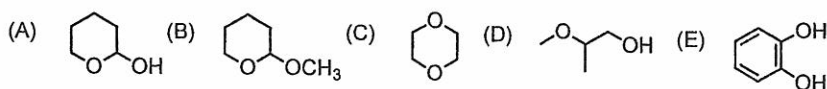
18. 4-fluoromethyl-2-nitroanisole is:



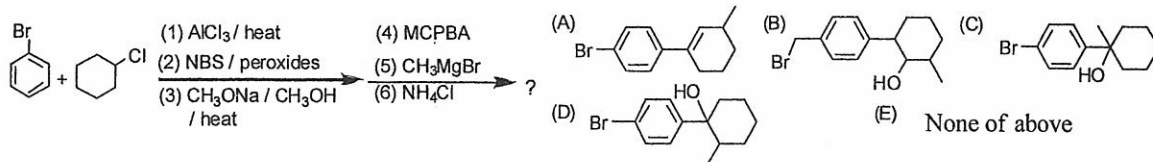
19. Which of the following substances, formula $\text{C}_8\text{H}_9\text{Br}$, might exhibit the following ^1H NMR absorptions?
(δ 2.80, triplet); (δ 4.65, triplet); (δ 7.20, multiplet)



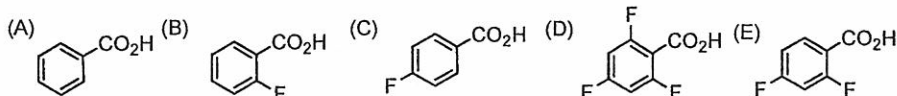
20. Which of the following compound is an acetal?



21. What product would result from the following series of reactions?



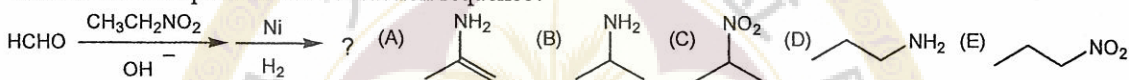
22. Which of the following would be the strongest acid?



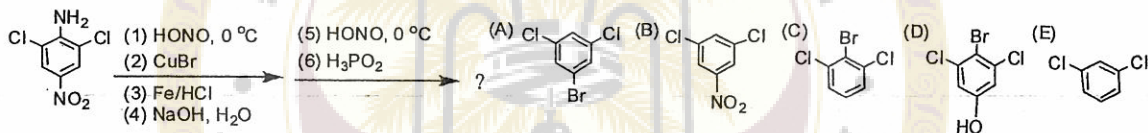
23. The relative reactivity of acyl compounds toward nucleophilic substitution is:

- (A) Amide > ester > acid anhydride > acyl chloride
 (B) Acyl chloride > ester > acid anhydride > amide
 (C) Ester > acyl chloride > acid anhydride > amide
 (D) Acyl chloride > acid anhydride > ester > amide
 (E) Acid anhydride > acyl chloride > ester > amide

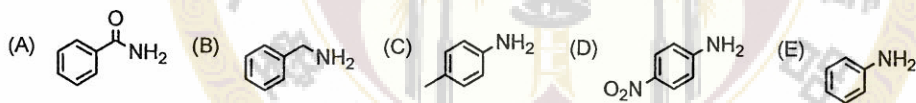
24. What is the final product of this reaction sequence?



25. What compound is likely to be obtained via the following reaction sequence?

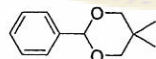


26. Which of the following compounds would be the strongest base?

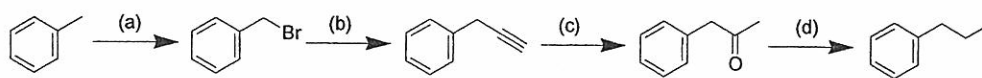


Part II. 問答題. Please provide a short answer for the following questions. 請於試卷內之「非選擇題作答區」
 依題號順序作答。(共 22 分)

一. How many ^{13}C NMR absorptions will you expect for the following compound? Explain. (6 分)



二. Propose the possible reagents for the following transformations (a)-(d): (共 12 分)



三. Rank the acidity of the protons indicated in the following structure: (4 分)

